D-Link®

DES-3216 10/100 Auto Negotiation Switch

User's Guide

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RECYCLABLE

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Wenden Sie sich mit allen Fragen die Service und Repartur betreffen an Ihren Servicepartner. Somit stellen Sie die Betriebssicherheit des Gerätes sicher.

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About This Guide

This section defines the scope of this guide and gives a summary of the contents of each chapter. It describes the features of the D-Link DES-3216 10/100 Auto Negotiation Switch. Information about the DES-3216 other D-Link products is available on our web site at www.dlink.com.

Audience

This user guide is intended for the networking or computer technician who is installing the DES-3216 on a network. Refer to other sources for information about networking in general.

All the information you need to install, configure and troubleshoot the DES-3216 is contained in the user guide.

Organization

Chapter 1, *Introduction*, gives a physical and functional overview of the DES-3216. The DES-3216 features, LEDs, and management methods are covered.

Chapter 2, *Installing the DES-3216*, covers installing and powering on the DES-3216.

Chapter 3, *Connecting the DES-3216 to the Network*, covers connecting the DES-3216 to the network, maximum cable length, cable specifications and connections between multiple DES-3216s.

Chapter 4, *LEDs*, covers reading and interpreting the LED panel.

Chapter 5, *Managing the DES-3216*, covers all the menus and configurations available.

Chapter 6, *Troubleshooting*, covers troubleshooting the DES-3216.

Appendix A, *DES-3216 Technical Specifications*, covers the technical specifications of the DES-3216.

1

Introduction

This chapter gives a physical and functional overview of the DES-3216. The DES-3216 is an intelligent, managed switch, designed for use on medium sized networks as part of the backbone or for use with other switches and hubs on a larger network.

The chapter is divided into the following sections. Each section briefly describes the features of the DES-3216. Most of the topics discussed will be explained in greater detail later in the manual.

The topics covered are:

- Summary of Features
- Panels of the DES-3216
- Management Methods
- Updating Firmware

Features

The DES-3216 has the following features:

- All 16 ports auto-negotiate 10/100 Mbps.
- The DES-3216 can be configured and customized to your network.
- The DES-3216 can be managed in three ways: Local Console Management, Telnet and SNMP.
- Supports Cut-through and Store-and-Forward switching.
- Supports Full and Half Duplex for both 10 Mbps and 100 Mbps. .
- Wire-speed packet filtering and forwarding for up to 16 ports.
- Eight thousand active MAC address table entries per device with self-learning and table aging.
- The DES-3216 supports SNMP for RFC 1213, RFC 1757, and RFC 1493.
- VLAN support for eight broadcast domains.
- Port Trunking support for bandwidth aggregation between two DES-3216 switches.

Front Panel

The DES-3216 is designed for management at a glance. The front panel of the DES-3216, displayed in Figure 1 has LEDs that give you essential information about the DES-3216 at a glance.

All 16 MDI-X ports on the DES-3216 can be used for network connections.

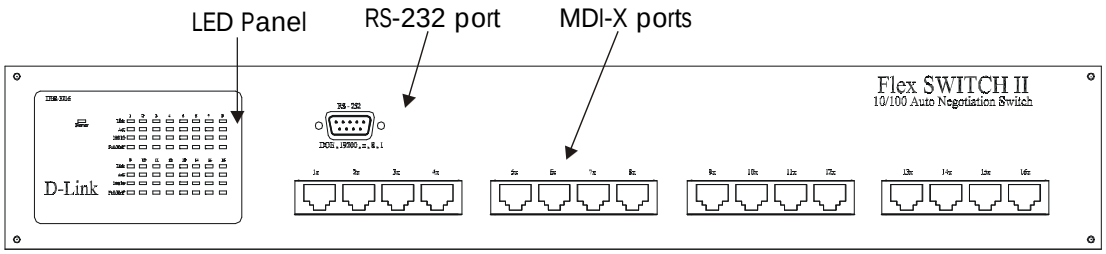

Figure 1: DES-3216 Front Panel

All LEDs are located on the front panel of the DES-3216. Their purpose is to allow you to monitor the operation and performance of the DES-3216 at a glance.

Rear Panel

The three pronged power plug, two fans and the on/off switch are located at the rear of the DES-3216 displayed in Figure 2. When installing the DES-3216, leave enough room to allow you to unplug the power cable if necessary and to attach the RS-232 cable for Local Console Management.

There are heat vents located on the sides. The fans and the vents help to cool the DES-3216. Always leave two inches of space around the DES-3216 so that air can circulate and cool the DES-3216.

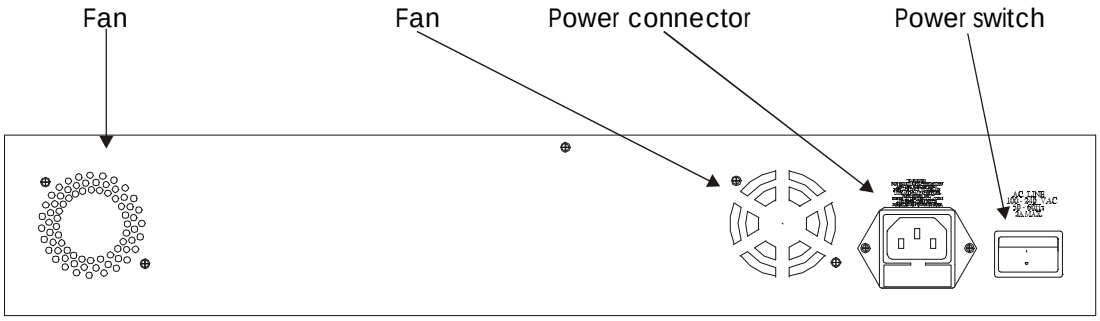

Figure 2: Rear Panel

Management Methods

The DES-3216 supports three management methods:

- Local Console Management
- Telnet Management
- D-View/ SNMP Management

Local Console Management

Local Console Management is done through the RS-232 Console port. Managing the DES-3216 in this mode requires a direct connection between a PC and the DES-3216.

Telnet Management

Telnet is done over the network. Once the DES-3216 is on the network, you can use Telnet to log in and change the configuration.

D-View/ SNMP Management

The DES-3216 supports SNMP through D-View, D-Link's proprietary SNMP application and through other vendors' SNMP applications. Please refer to the appropriate documentation for instructions on installing and using D-View and other SNMP applications.

Updating Firmware

Firmware can be updated quickly and easily. See the section Software Update Menu, *Chapter 5*, for instructions on updating firmware.

2

Installing the DES-3216

This chapter covers the following:

- Unpacking the DES-3216
- Installation options and instructions
- Powering on the DES-3216

Open the box and carefully unpack the DES-3216. You should have all the items on the following checklist:

- DES-3216 10/100 Auto Negotiation Switch
- RS-232 DCE serial cable
- Two mounting brackets and eight screws
- Four rubber pads with adhesive backing
- One six foot (1.82 m) power cord
- DES-3216/3224 User's Guide CD ROM

If any items are missing, contact the retailer where you purchased the DES-3216 for assistance.

Be sure to register the DES-3216 immediately. Failure to register the DES-3216 may void the warranty.

Installation Options

There are two options for installing the DES-3216: desktop/ shelf installation or rack installation.

Follow these guidelines for desktop/ shelf installation or rack installation:

- The surface must support 18 lbs or 8 kg.
- The power source must be within six feet (1.82 m)
- Power cord and cables should never be stretched
- Leave at least two inches around the DES-3216 for ventilation

The following tools and materials may be necessary to install the DES-3216:

- Screwdriver to install the brackets as needed
- Wire cutters to cut cable as needed for network connections
- Crimpers to crimp cable as needed
- RJ-45 connectors as needed

Desktop/ Shelf Installation

Follow these steps to install the DES-3216 on a desktop or shelf:

1. Place the four rubber pads at the four corners of the DES-3216.

2. Install the DES-3216 on the desktop/shelf where you would like to place it.

Rack Installation

The DES-3216 can be mounted in an EIA standard size, 19 inch rack. The dimensions of the DES-3216 are 17.4 x 10.4 x 3.2 inches. The DES-3216 can be placed in a wiring closet along with other equipment.

Follow these steps to install the DES-3216 on a rack:

1. Attach a mounting bracket to each side of the DES-3216 with the screws provided.
2. Slide the DES-3216 into the rack and use the screws provided to secure the DES-3216 to the rack.
3. Connect the power cord and verify that the DES-3216 is receiving adequate power.

Power On

The power supply will adjust to the local power source automatically. The DES-3216 may be plugged in without having any or with all LAN segment cables connected.

The power plug is located at the rear of the DES-3216. Plug the cable into the wall socket and plug the other end into the DES-3216. There is a power on/ off switch located at the rear of the DES-3216. Move the switch to the on position to power the DES-3216 on. The Power LED will light and all ports will auto negotiate the proper speed and duplex mode when the DES-3216 is powered on.

Reboot the DES-3216 if there is a problem. Contact D-Link Systems, Inc. for technical support.

Check the configuration of the DES-3216 after a power failure but do not reset unless it is necessary.

The DES-3216 can be used with power sources in the range 100 to 240 VAC., 50 to 60 Hz.

3

Connecting the DES-3216 to the Network

This chapter covers the following:

- Cable Specifications
- Ports
- Connecting the DES-3216 to another DES-3216
- Connecting the DES-3216 to other switches and hubs

This section deals with making cables and connecting the DES-3216 to other devices. It is extremely important that cables have the correct pin arrangement and that the proper cables be used when connecting to servers, switches, hubs, workstations and other devices.

Cable Specifications

The type of cable you use depends on the speed of your network. A network running at 10 Mbps can use lower grade cable than a network running at 100 Mbps., Table 1: Cable Length, indicates cable requirements for Ethernet and Fast Ethernet.

Table 1: Cable Length

Ethernet Type	Cable Requirements	Maximum Length
10BASE-T	Category 3,4, or 5 UTP or STP	328 ft (100 M)
100BASE-TX	Category 5 UTP or STP	328 ft (100 M)

Do not use telephone cable. Telephone cable does not support Ethernet or Fast Ethernet.

Use the following guidelines when handling cables:

- Do not stretch or bend cables.
- Do not put cables near sources of electromagnetic interference.
- Do not create trip hazards by laying cables in aisles and walkways.
- Secure cables to the floor when routing in aisles or walkways.

In order for Ethernet or Fast Ethernet to work the wires must be arranged correctly inside the RJ-45 connector when you make cables. The most common problem on Ethernet or Fast Ethernet networks is the cable. If you migrate from Ethernet to Fast Ethernet, make sure the cables are pinned out properly.

There are two types of cables: straight through and crossover. Category 3, 4, or 5 UTP/STP cable has eight wires inside the sheath. The wires form four pairs. Straight through cable has the same pin out, inside the RJ-45 connector, at both ends. Crossover cable has a different pin arrangement at each end. Fast Ethernet does not tolerate incorrect pin arrangements. You

must use the correct pin arrangement in order for the DES-3216 to work properly. See Figure 3 for an example of straight through and crossover cable.

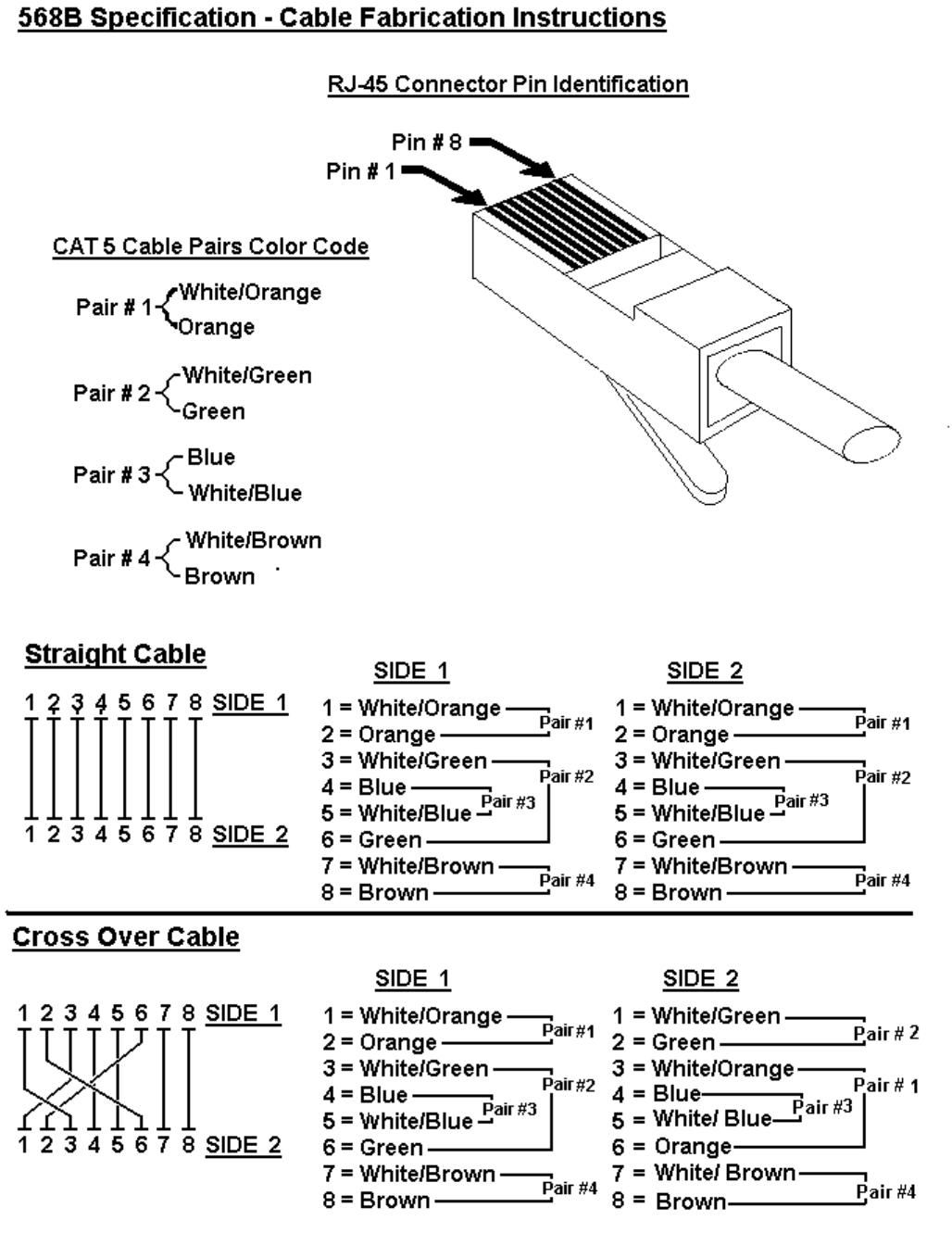

Figure 3: Cable Diagram

Ports

MDI-X Port

MDI-X ports are crossover ports. The pin arrangement is the same as the arrangement in a crossover cable. The advantage of an MDI-X port is that you can connect a device with an MDI-II port without using a crossover cable. The steps for connecting the DES-3216 to 10 Mbps devices or 100 Mbps devices are the same. All the ports will auto negotiate the proper speed and duplex mode. The DES-3216 has one row of 16 MDI-X ports.

Follow these steps to connect cables to the DES-3216:

1. Check for the appropriate cable configuration for each device.
2. Plug one end of the cable into any of the MDI-X ports.
3. Plug the other end into the appropriate port on the other device.
4. Verify that the LED indicates connection at the proper speed and duplex mode.

RS-232 Port

Follow these steps to connect the DES-3216 and another device:

1. Plug one end of the cable provided into the port.
2. Plug the other end into the PC.
3. Run HyperTerminal or a terminal emulation program using the settings given for Local Console Management at the beginning of Chapter 5, Managing the DES-3216.

DES-3216 to DES-3216 Connection

Connect two DES-3216s together one of the MDI-X ports. The DES-3216 is also compatible with the DES-5016 and DES-5024. Port Trunking can be configured on the device if more than one port is connected between two DES-3216s or if more than one port is connected between a DES-3216, DES-3224, DES-5016 and DES-5024. Port trunking increases the efficiency of the DES-3216 by increasing the bandwidth. See the section on Port Trunking in Chapter 5 for instructions on how to configure Trunked ports.

Connecting the DES-3216 to the DES-5024 and Hubs

You can connect the DES-3216 to other switches and hubs on the network. The DES-3216 and the DES-5024 are compatible products that can be connected easily. If you create multiple connections between devices, create Trunked ports for more efficiency. See the section on Port Trunking for more details.

4

LEDs

The LED panel of the DES-3216, displayed in Figure 4, is designed to allow you to manage the DES-3216 at a glance. The LEDs indicate the following:

- Power
- Speed
- Link
- Activity
- Duplex mode

All of the LEDs are described in detail. Use the tables to determine the meaning of each LED.

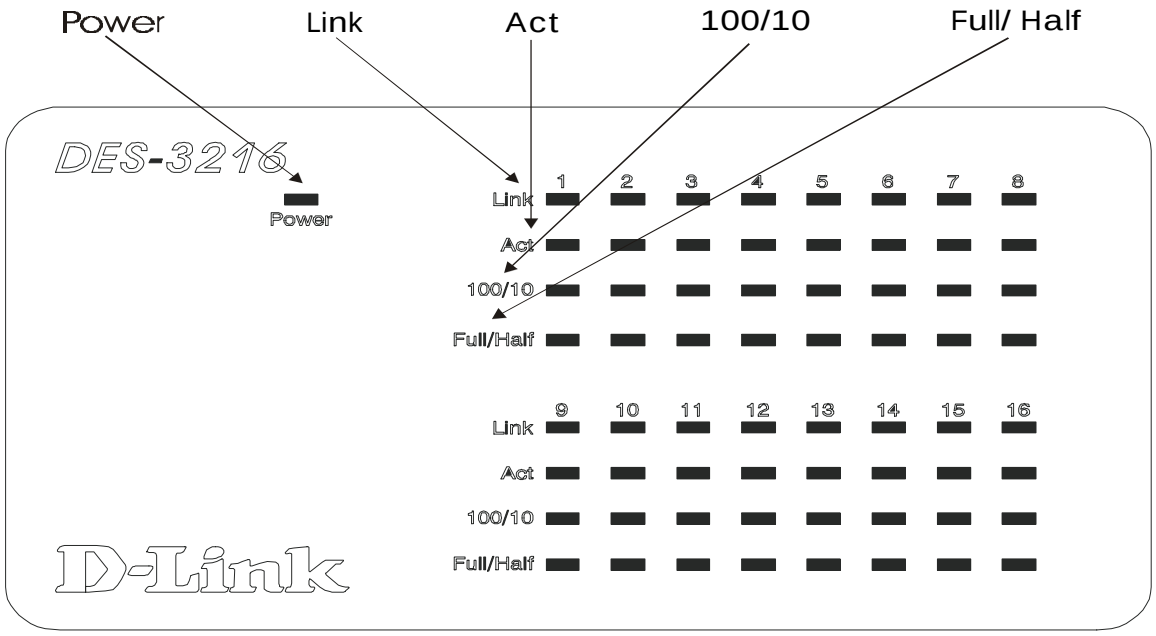

Figure 4: DES-3216 LED Panel

Power LED

The power LED lights when the DES-3216 is powered on. The purpose is to confirm that the DES-3216 is getting adequate power. See Figure 4.

Table 2: Power LED

Status	Color	Meaning
On	Green	DES-3216 is powered on
Off	Dark	DES-3216 is powered off, check power cable and connection

DES-3216 LED Panel

The LED panel allows you to manage the DES-3216 at a glance. The first group of LEDs is numbered 1-8 and the second is numbered 9-16. The numbers on the LEDs corresponds to the numbers on the ports. See Table 3: DES-3216 LEDs for an explanation of the LEDs.

The Link LED indicates that there is a link at the port. If a cable is plugged into the port and the link LED is off, check the cable and connection.

The Act (Activity) LED indicates there is activity, either reception or transmission, at the port.

The 100/10 LED indicates the speed of the port. All ports will auto negotiate 100 Mbps or 10 Mbps.

The Full/ Half LED indicates the duplex mode the port is in. Ports in Full are operating at full duplex. Full duplex means the port is transmitting and receiving data simultaneously. Ports in Half are operating in half duplex. Half duplex means that data is only being transmitted or received in one direction at a time.

Table 3: DES-3216 LEDs

LED	Green	Dark
Link	Link is up	No link or link is down
Act	Flashing, data is passing through the port	No data is passing through the port
100/10	Port is working at 100 Mbps	Port is working at 10 Mbps
Full/ Half	Port is in full duplex mode	Port is in half duplex mode

5

Managing the DES-3216

This chapter shows the menus used to manage the DES-3216.

Three types of management are available on the DES-3216:

- Local Console Management (out-of-band)
- Telnet Management (in-band)
- D-View/ SNMP Management

The DES-3216 can be managed in-band or out-of-band. In-band management refers to managing the DES-3216 through one of the MDI-X ports.

Out-of-band management means going through the RS-232 port.

The interface and options are the same with Local Console and Telnet Management. The difference is the type of connection and the port that is used to manage the DES-3216.

D-View is a proprietary SNMP management program. D-View is provided with the DES-3216. The DES-3216 supports other SNMP management applications and uses standard MIB. Refer to appropriate documentation for installing and using other SNMP application programs. The look and feel of D-View is different from other management types. Refer to other documentation if you are using other vendors' SNMP applications.

All instructions given in this chapter assume that you are logged into the DES-3216 and are at the appropriate panel for carrying them out.

Local Console Management

Local Console Management is always done through the RS-232 serial port and requires a direct connection between the DES-3216 and a PC. This type of management is very useful when the network is down and the DES-3216 cannot be reached by any other means.

Use Local Console Management to log into the DES-3216 for the first time. You do not need to know the IP address to log into the DES-3216 using Local Console Management. You can change all the settings and configure the DES-3216, set the IP address and perform other management functions.

Follow these steps to begin a management session using Local Console Management:

1. Attach the male end of the RS-232 serial cable provided with the DES-3216 to the RS-232 port located at the front of the DES-3216.
2. Attach the other end to the serial port of a PC or workstation.
3. Run a terminal emulation program using the following settings:
   - **Emulation:** VT-100/ANSI compatible
   - **BPS:** 19 200

- **Data bits:** 8
- **Parity:** None
- **Stop bits:** 1
- **Flow Control:** None
- **Enable:** Terminal keys

4. Press Enter to display the login panel.
5. Log in using the default User Name and Password. The User Name and Password are case sensitive.
   - **User Name:** D-Link
   - **Default Password:** D-Link
5. Press Enter to reach the Main menu.

Telnet

You can manage the DES-3216 via Telnet session. However, first you must assign a unique IP address to the DES-3216. Use Local Console Management to log into the DES-3216 for the first time so that you can assign an IP address. Once you have assigned an IP address to the DES-3216, you can use the management method of your choice.

Telnet management can be done through any of the MDI-X ports on either switch.

Follow these steps to manage the DES-3216 through a Telnet session:

1. Assign an IP address to the DES-3216.
2. Run Telnet.
3. Log into the DES-3216.

Log In

The Log In panel, displayed in Figure 5, is the first panel you see when connecting to the DES-3216. All management methods require you to log into the DES-3216 with your user name and password before beginning a management session. For security, you should change the default User Name and Password.

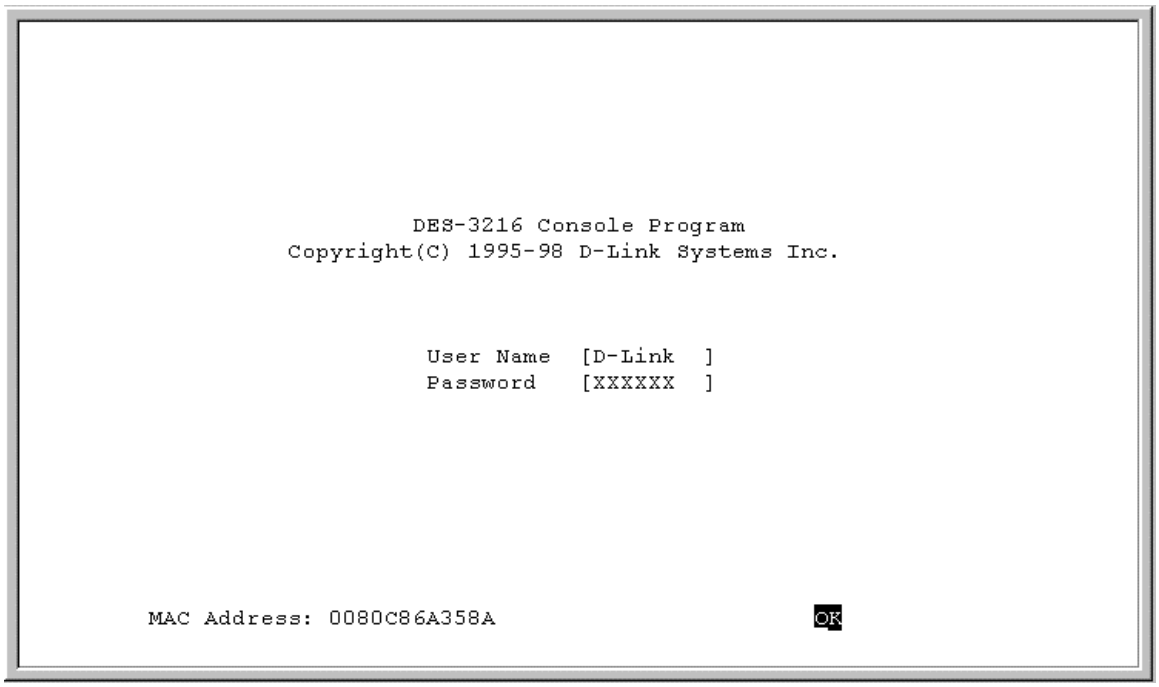

Figure 5: Log In

Follow these steps to log into the DES-3216 for the first time:

Enter the default User Name and Password and press Enter. The User Name and Password are case sensitive.

- **Default User Name:** D-Link
- **Default Password:** D-Link

The MAC Address at the bottom of the screen cannot be changed.

Help Message

A one page panel, displayed in Figure 6, is available. The menu lists the keystroke and typographic conventions available on the DES-3216.

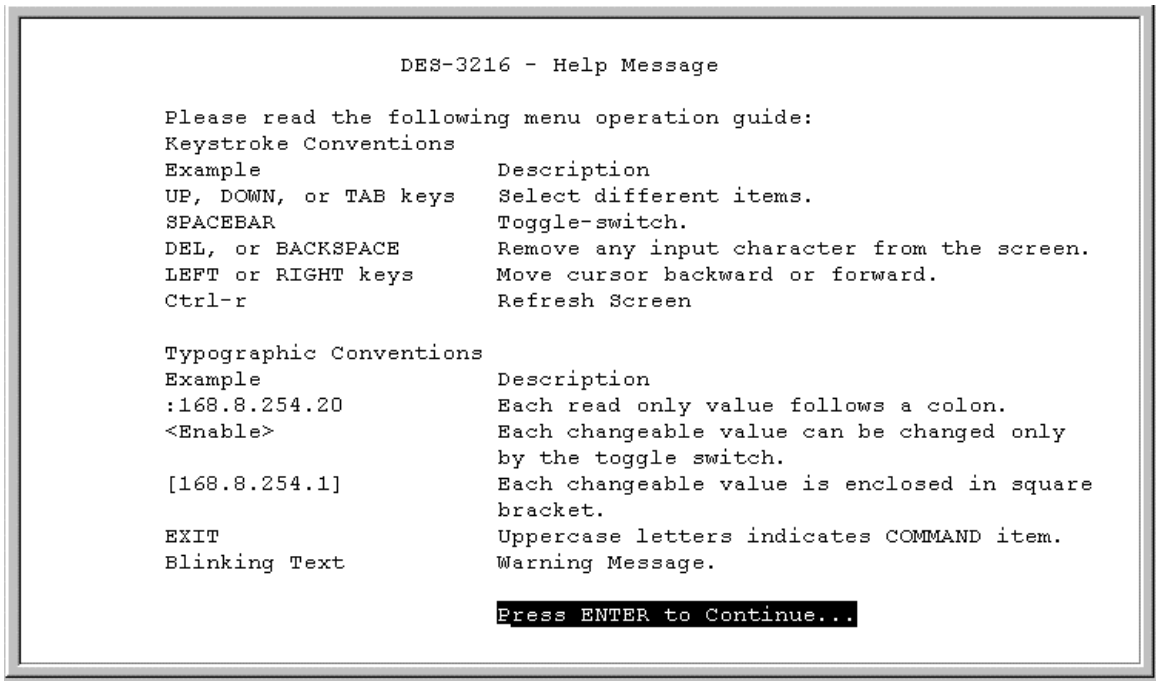

Figure 6: Help Message

Panel Conventions

Keystroke Conventions

Example	Description
UP, DOWN, or TAB keys	Select different items.
SPACEBAR	Toggle-switch.
DEL, or BACKSPACE	Remove any input character from the screen.
LEFT or RIGHT keys	Move cursor backward or forward.
Ctrl-r	Refresh Screen

Typographic Conventions

Example	Description
:168.8.254.20	Each read only value follows a colon.
<Enable>	Each changeable value can be changed only by the toggle switch.
[168.8.254.1]	Each changeable value is enclosed in square brackets.
EXIT	Uppercase letters indicate a COMMAND item.
Blinking Text	Warning Message.

After you are finished viewing the help panel, press Enter to return to the main menu.

Console Program

The Console Program, shown in Figure 7, is the main menu of the DES-3216.

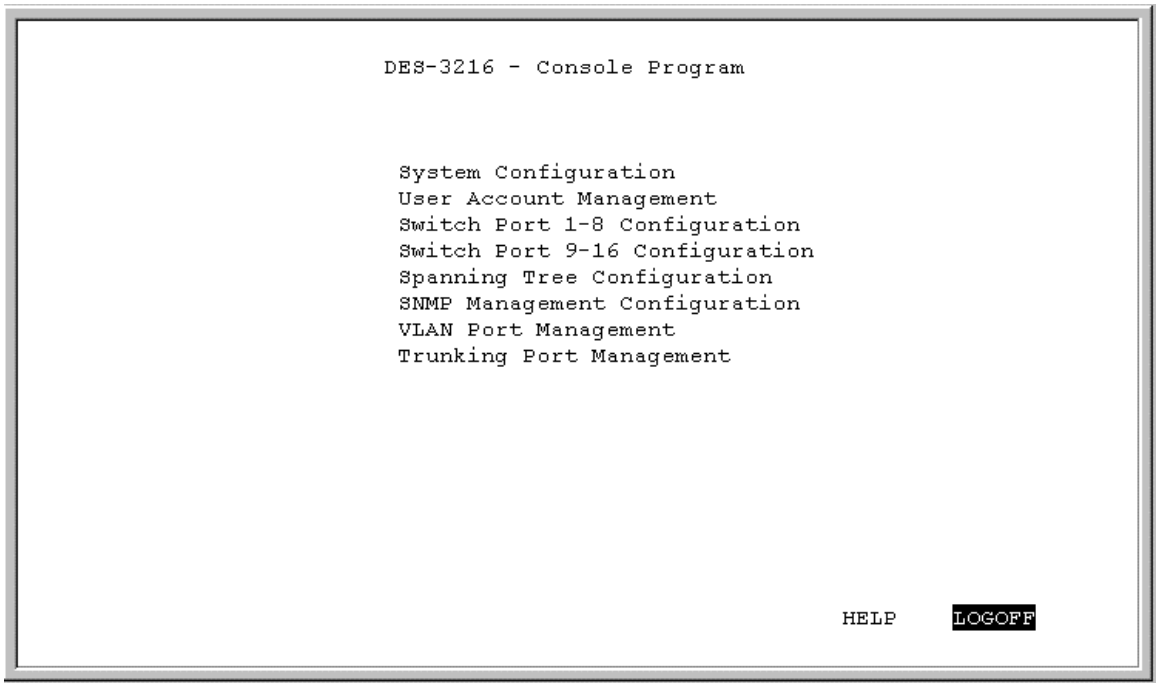

Figure 7: Console Program

System Configuration

The System Configuration menu gives you general information about the DES-3216 and allows you to assign a LAN IP Address, Subnet Mask, LAN Default Gateway and contact information on the system administrator.

User Account Management

The User Account Management menu allows you to add users, delete users and modify user account information.

Switch Port 1-8, 9-16 Configuration

Switch Port 1-8 Configuration and Switch Port 9-16 Configuration allow you to configure individual ports. You can set the speed, duplex mode, enable and disable ports and make other changes.

Spanning Tree Configuration

The Spanning Tree Configuration menu allows you to enable or disable Spanning Tree Algorithm, set the Bridge Priority, Hello Time, Forward Delay Time and the Max Age Time.

SNMP Management Configuration

The SNMP Management Configuration menu allows you to create SNMP Communities and configure SNMP Trap Manager Settings.

VLAN Port Management

The VLAN Port Management menu allows you to create, delete and modify VLANs quickly and easily.

Trunking Port Management

The Trunking Port Management menu allows you to create, delete and modify Trunking Ports quickly and easily.

Follow these steps to select a menu:

1. Use the tab key or the up and down arrow keys to select an option.
2. Press Enter.

System Configuration Menu

The System Configuration menu, displayed in Figure 8, allows you to change the configuration of the DES-3216.

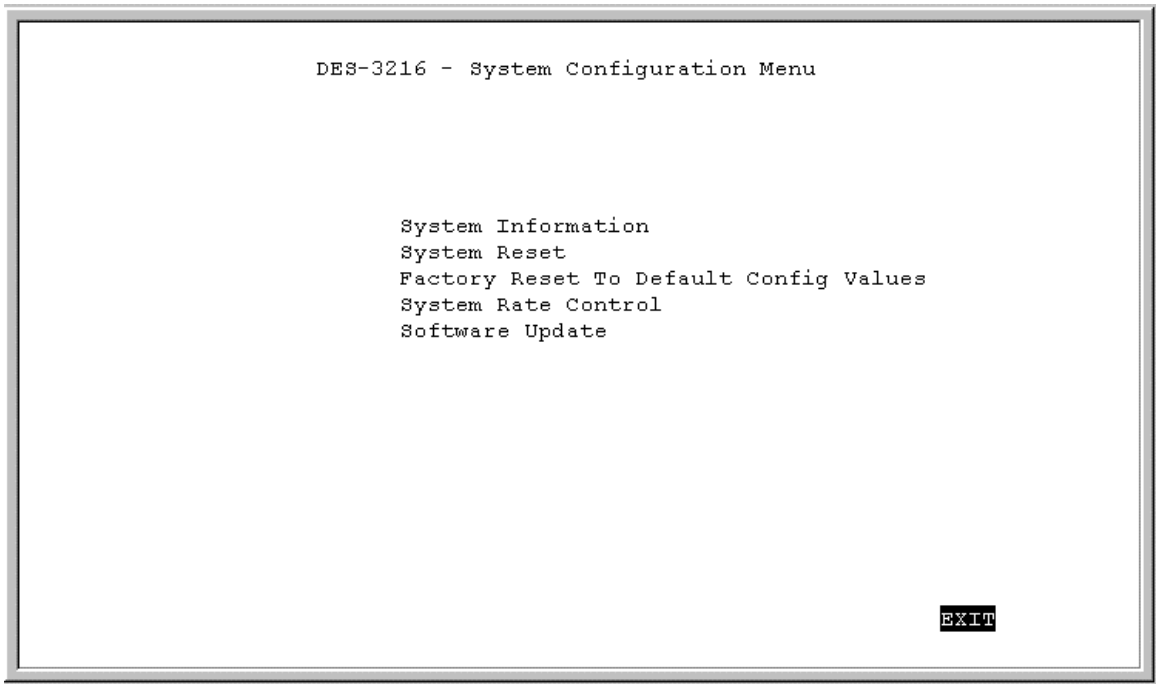

Figure 8: System Configuration menu

System Information

The System Information menu displays the Hardware revision, MAC address, LAN IP address and other information on the DES-3216.

System Reset

The System Reset menu allows you to reset the DES-3216 through software rather than powering off.

Factory Reset to Default Config Values

The Factory Reset to Default Config Values menu allows you to reload factory default configurations.

System Rate Control

The System Rate Control menu allows you to choose Store & Forward or Cut-Through. The advantages and disadvantages of each are explained in a later section.

Software Update

The Software Update menu is used to update the software on the DES-3216. This feature is only supported through Local Console Management.

Follow these steps to select a menu:

1. Highlight the menu option.
2. Press Enter.

System Information Menu

The System Information menu, displayed in Figure 9, allows you to enter management and configuration information on the DES-3216.

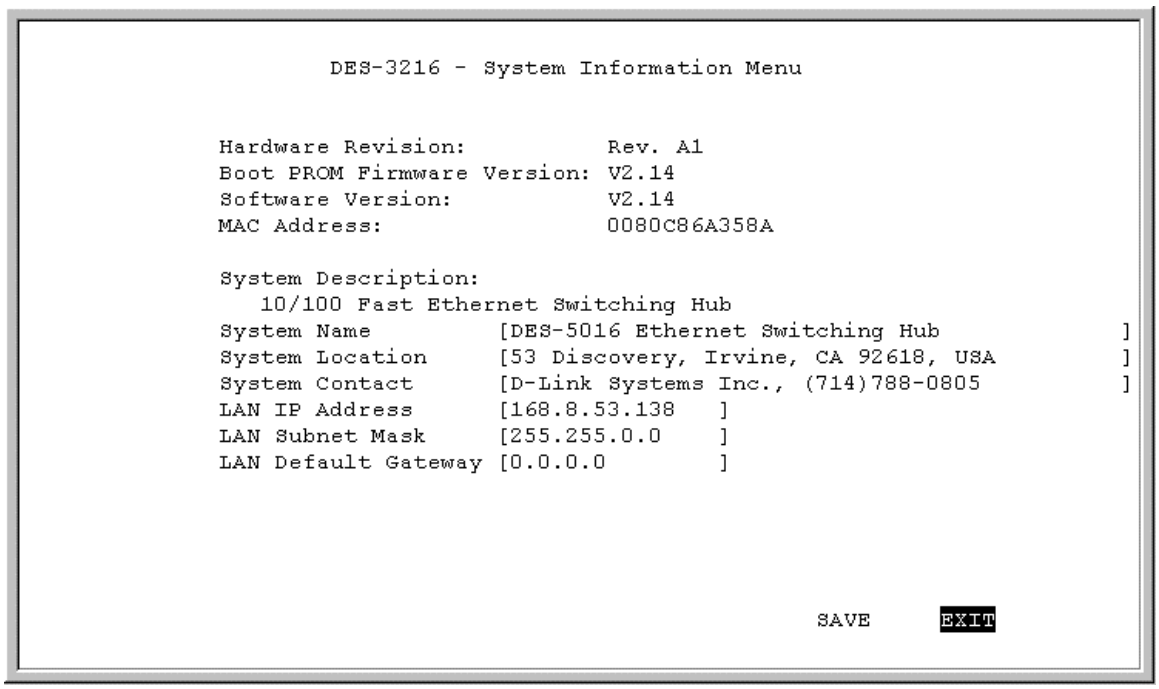
DES-3216 - System Information Menu
Hardware Revision: Rev. A1
Boot PROM Firmware Version: V2.14
Software Version: V2.14
MAC Address: 0080C86A358A
System Description:
10/100 Fast Ethernet Switching Hub
System Name [DES-5016 Ethernet Switching Hub]
System Location [53 Discovery, Irvine, CA 92618, USA]
System Contact [D-Link Systems Inc., (714)788-0805]
LAN IP Address [168.8.53.138]
LAN Subnet Mask [255.255.0.0]
LAN Default Gateway [0.0.0.0]
SAVE
EXIT

Figure 9: System Information menu

Hardware Revision

Specifies the hardware revision and the product generation. Each revision is numbered incrementally.

Boot PROM Firmware Version

Specifies the version of the Boot PROM being used on the DES-3216. Each version is numbered incrementally.

Software Version

Specifies the software version being used on the DES-3216. You can update the software. Each version is numbered incrementally.

MAC Address

Specifies the hardwired address of the DES-3216. This address cannot be changed.

System Description

Brief manufacturer description of the DES-3216. This value cannot be changed.

System Name

Specifies the full name of the DES-3216. This value can be changed, allowing you to assign a unique name to the DES-3216. You can enter up to 44 characters.

System Location

Specifies the physical location of the DES-3216, such as a building number or street address. You can enter up to 44 characters.

System Contact

Specifies the contact information of the network administrator. You can enter up to 44 characters.

LAN IP Address

Specifies the unique IP address of your LAN. You can enter up to 15 characters.

LAN Subnet Mask

Specifies the subnet mask, if you are subnetting. If you are not subnetting leave the default in place. You can enter up to 15 characters.

LAN Default Gateway

Specifies the default gateway. You can enter up to 15 characters.

Follow these steps to enter user changeable information:

Select the field you would like to edit.

1. Delete the default information
2. Enter the new information.
3. Select Save and press Enter. Follow screen prompts.

System Reset

The System Reset panel, displayed in Figure 10, enables you to reset the DES-3216 without powering off.

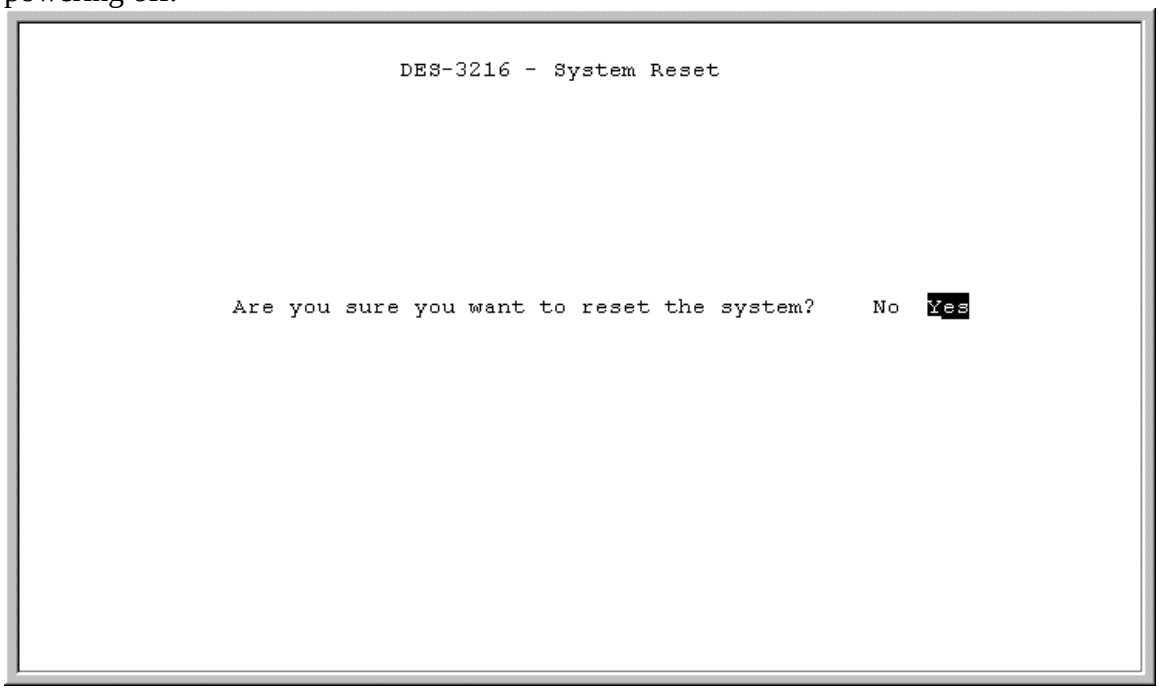

Figure 10: System Reset

Some configurations will require you to reset the DES-3216 in order for them to take effect. Screen prompts will tell you to reset the DES-3216 in order for them to take effect.

Follow these steps to reset the DES-3216:

1. Select Yes.
2. Press Enter.

To exit without resetting:

1. Select No.
2. Press Enter.

Factory Reset

The Factory Reset panel, displayed in Figure 11, is used to reset the DES-3216 and restore all factory default values. Using this panel erases all configurations and customization.

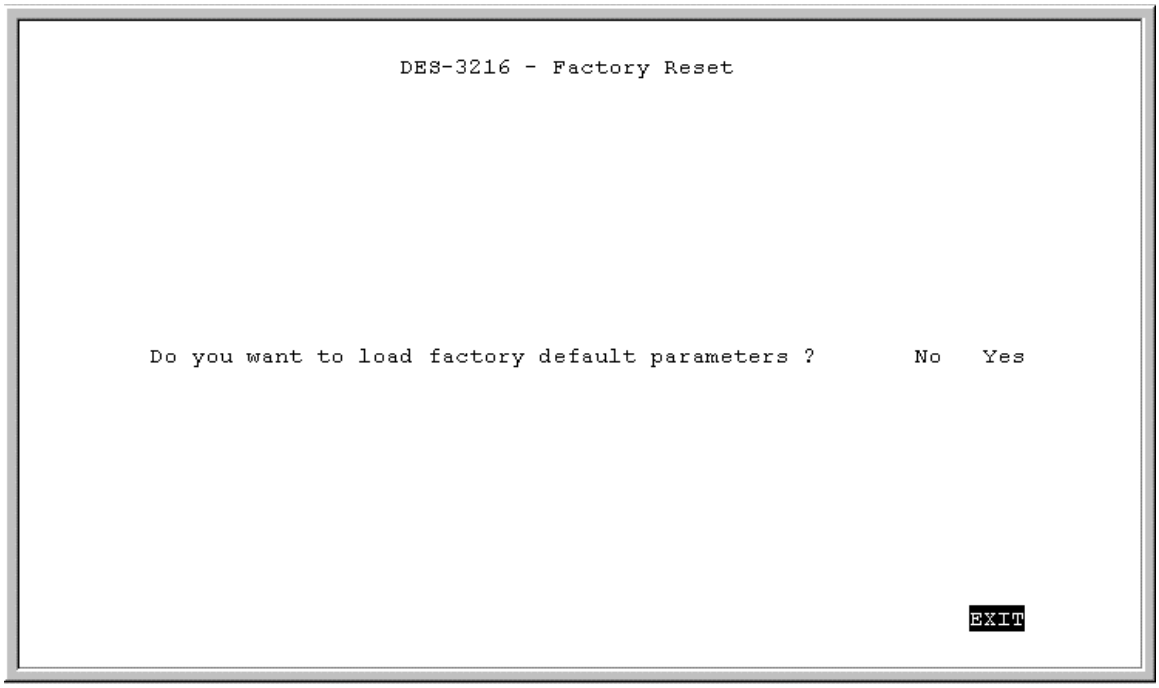

Figure 11: Factory Reset

Follow these steps to restore factory default configurations:

1. Select Yes
2. Press Enter.

You will see a confirmation panel, displayed in Figure 12. Select Yes to confirm your choice. Select No to return to the System Configuration menu.

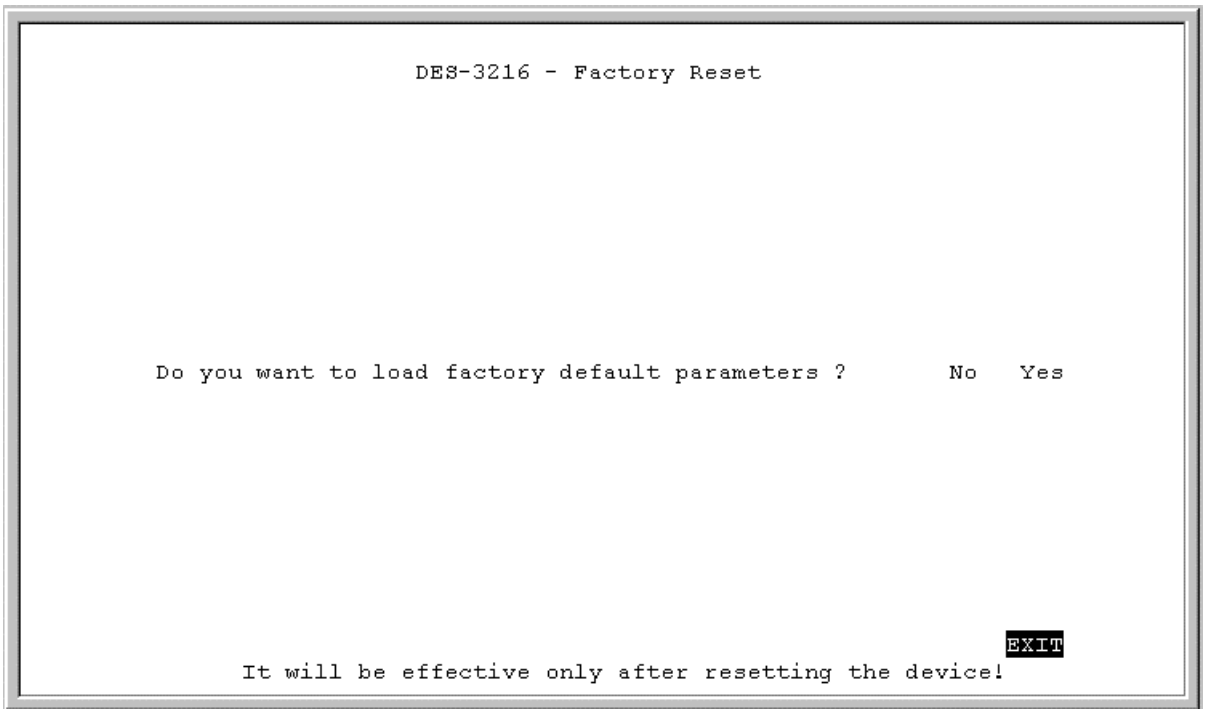
DES-3216 - Factory Reset
Do you want to load factory default parameters ?
No
Yes
EXIT
It will be effective only after resetting the device!

Figure 12: Factory Reset Confirmation

Follow these steps to exit the panel without restoring factory default parameters:

1. Select No or Exit.
2. Press Enter.

System Rate Control

The System Rate Control panel, displayed in Figure 13, allows you to set the packet forwarding rate on the DES-3216. There are two options: Store & Forward and Cut-Through.

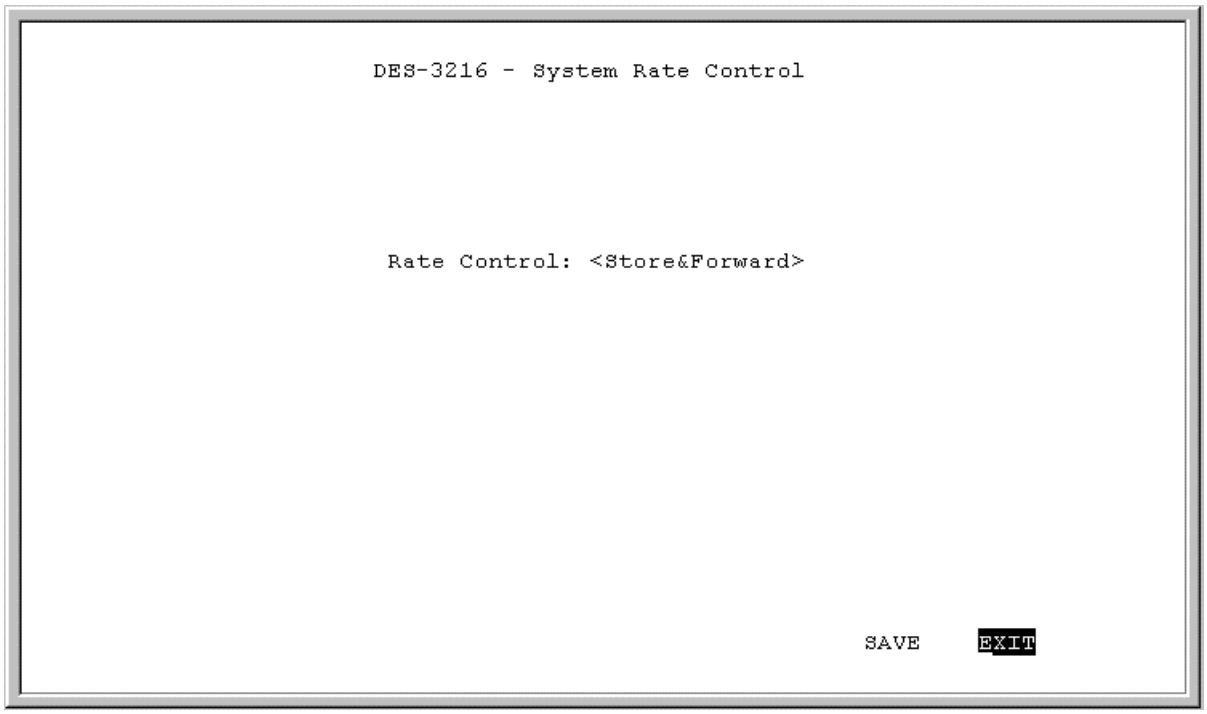

Figure 13: System Rate Control

The DES-3216 can be set for Store and Forward or Cut-Through. This is a global setting that affects all the ports except the RS-232 port.

Store and Forward means that when the DES-3216 receives an incoming packet it "stores" the packet until the entire data packet has been received before it "forwards" the packet to a destination.

In Cut-Through mode the DES-3216 begins sending out the packet as soon as it receives the first 128 bytes of data. The first 128 bytes contain the destination of the packet.

Advantages of Store and Forward

Store and Forward only sends out valid data packets. Bad packets created by collisions on the network or damaged packets are filtered out.

Always use Store and Forward when some devices on the network run at 10 Mbps and others run at 100 Mbps.

Disadvantages of Store and Forward

Store and Forward requires more time because it receives the whole packet before sending it out. Every byte buffered is an additional eight microseconds of delay. For example, 1500

byte packets are delayed by 1200 microseconds in a Store and Forward device versus 60 microseconds in a Cut-Through device.

Store and Forward requires more memory because the DES-3216 must store the packet before sending it out.

Advantages of Cut-Through

Cut-Through is faster because the packet is sent as soon as the first 128 bytes are received.

Cut-Through requires less memory since the DES-3216 only reads the address but does not store the entire message.

Disadvantages of Cut-Through

Bad packets are perpetuated, taking up bandwidth.

The benefits diminish in high traffic networks.

Cut-Through can not be used on networks that use both Ethernet and Fast Ethernet. The network must use one or the other.

Follow these steps to change the default setting from Store and Forward to Cut-Through:

1. Toggle the space bar to change the setting.
2. Select Save and press Enter.

Software Update Menu

The Software Update menu, displayed in Figure 14, is used to upgrade the software on the DES-3216.

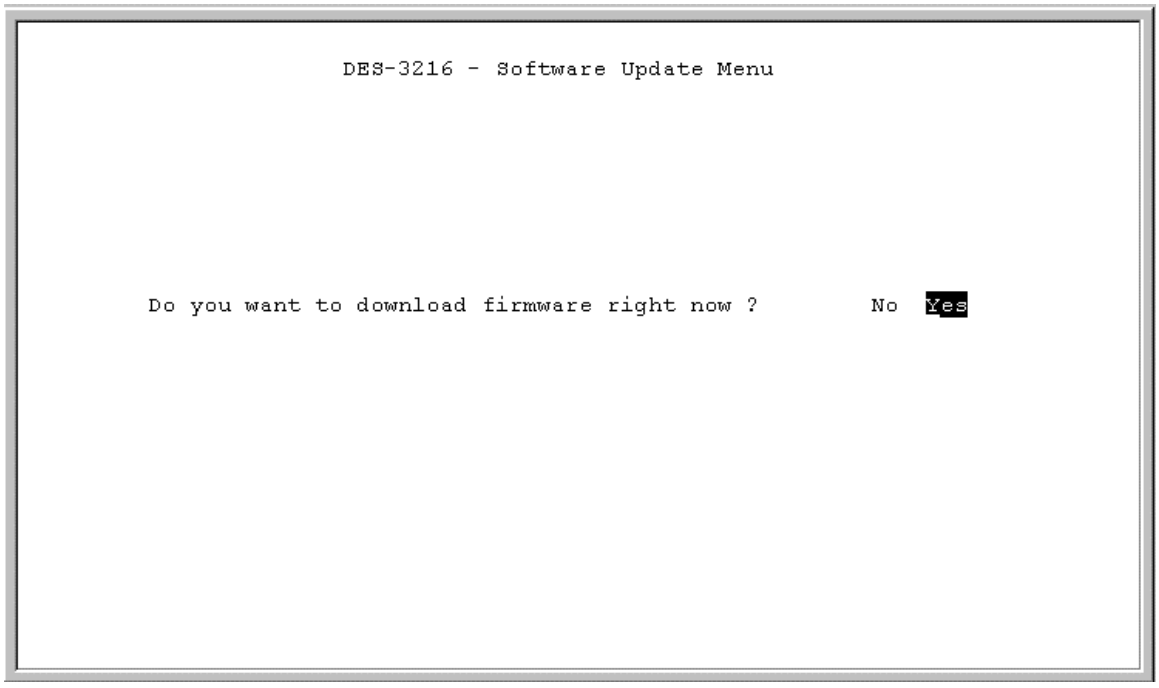

Figure 14: Software Update

Follow these steps to upload new software:

1. Load the new software to the hard drive of the PC you will be downloading from. Never attempt to load software from the floppy drive.
2. Connect the DES-3216 and the PC with the software on it with the RS-232 cable provided. Use the settings given at the beginning of this chapter. Never attempt to load firmware through Telnet.
3. Select Yes on the Software Update menu.
4. You will see the panel displayed in Figure 15. Select Transfer on the HyperTerminal menu bar at the top of the screen.

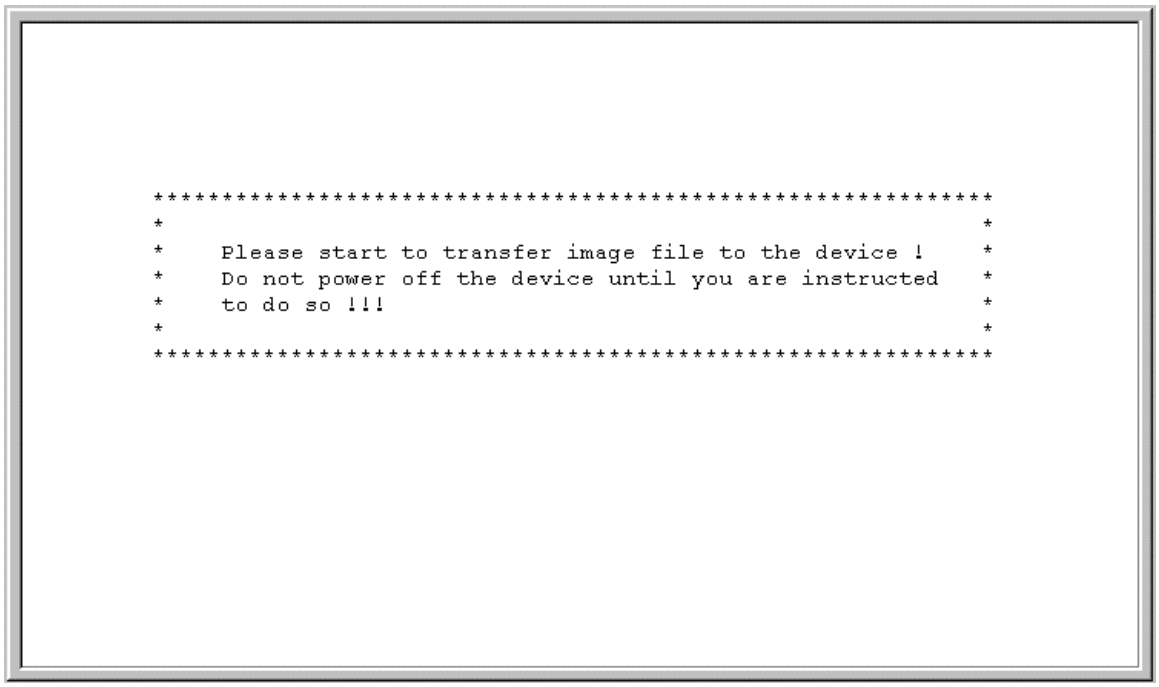

Figure 15: Software Update Transfer

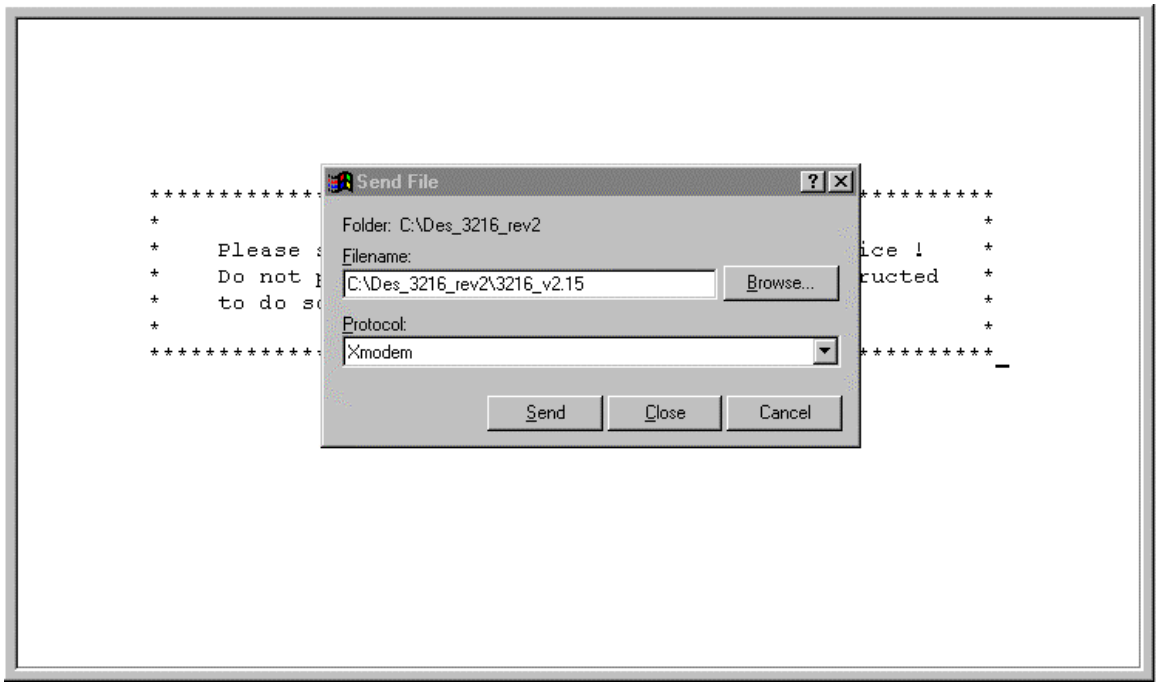

Figure 16: Send File

5. Select Browse on the panel displayed in Figure 16. The browse option shows the contents of your hard drive. You must specify the path from the DES-3216 to the file the firmware is in. Navigate to the file the firmware is stored in and select it. Use XMODEM to transfer the file.

6. The panel, displayed in Figure 17, will display statistics about the transfer, including the elapsed time and the time remaining.

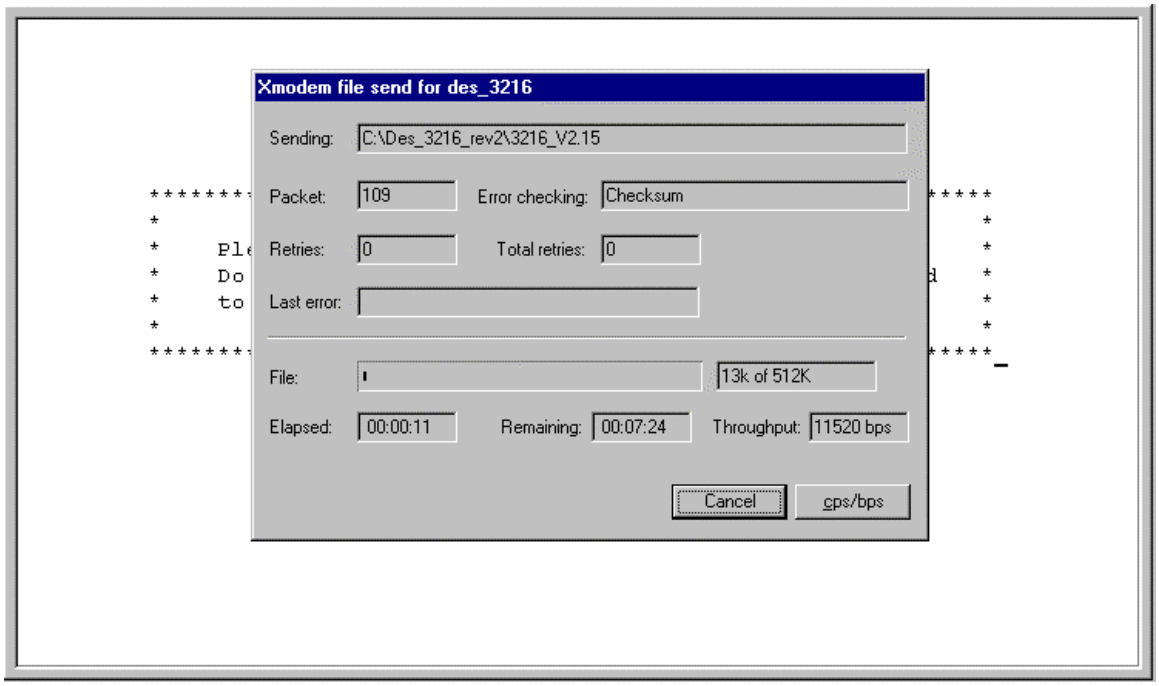

Figure 17: File Transfer through Xmodem

When the transfer is complete you will see the panel in Figure 18. The DES-3216 will reset itself automatically and you will have to log in again.

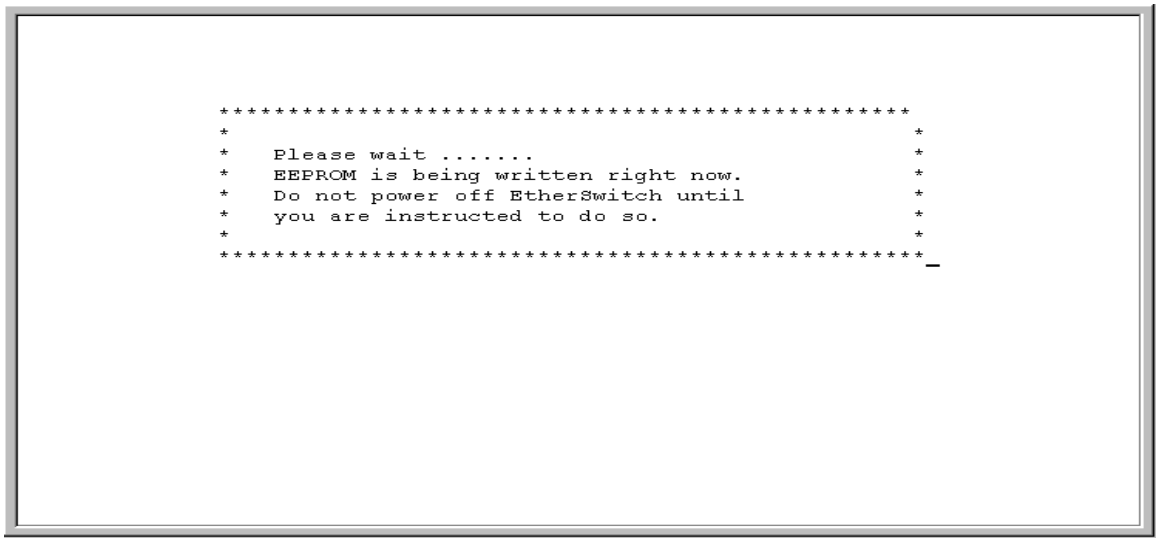

Figure 18: Message Displayed as EEPROM is Being Written

User Account Management

The User Account Management panels allow you to add users, delete users and modify user access rights.

Follow these steps to reach the User Account Management panels:

1. Select User Account Management on the Main menu.
2. Press Enter.

User Account Change Menu

The User Account Change menu, displayed in Figure 19, allows you to add users, delete users, and modify user rights.

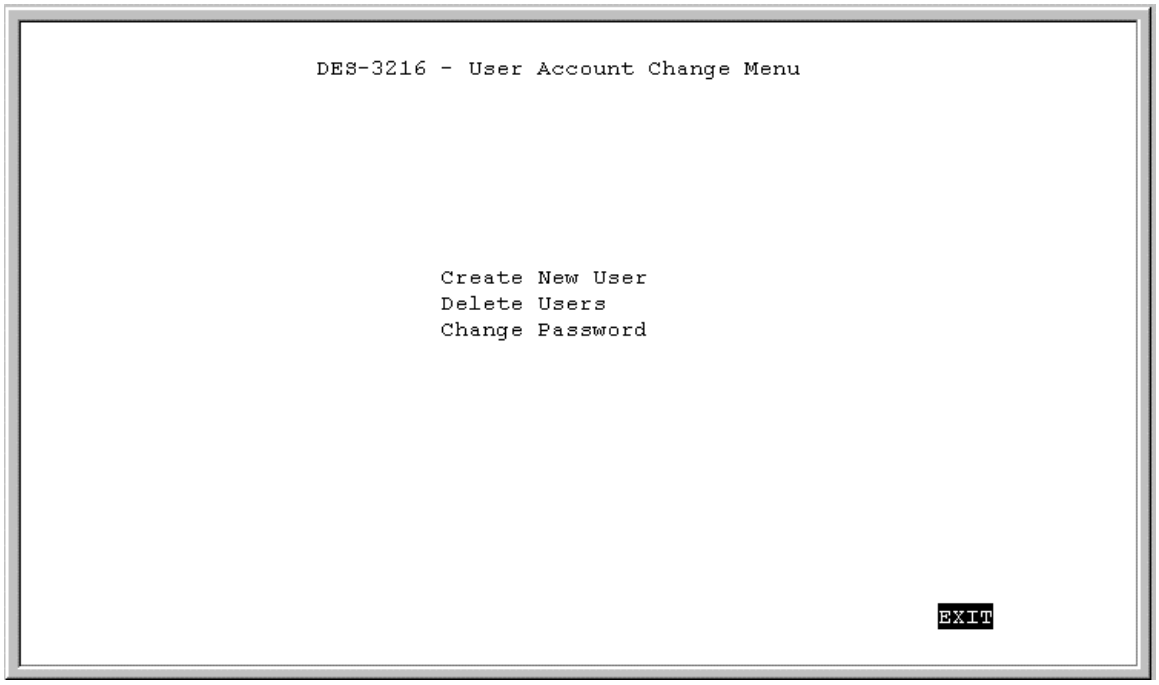

Figure 19: User Account Change menu

Follow these steps to select a menu option:

1. Select an option.
2. Press Enter.

Create New User

The Create New User panel, displayed in Figure 20, allows you to add new users. You can have a total of three users on the DES-3216.

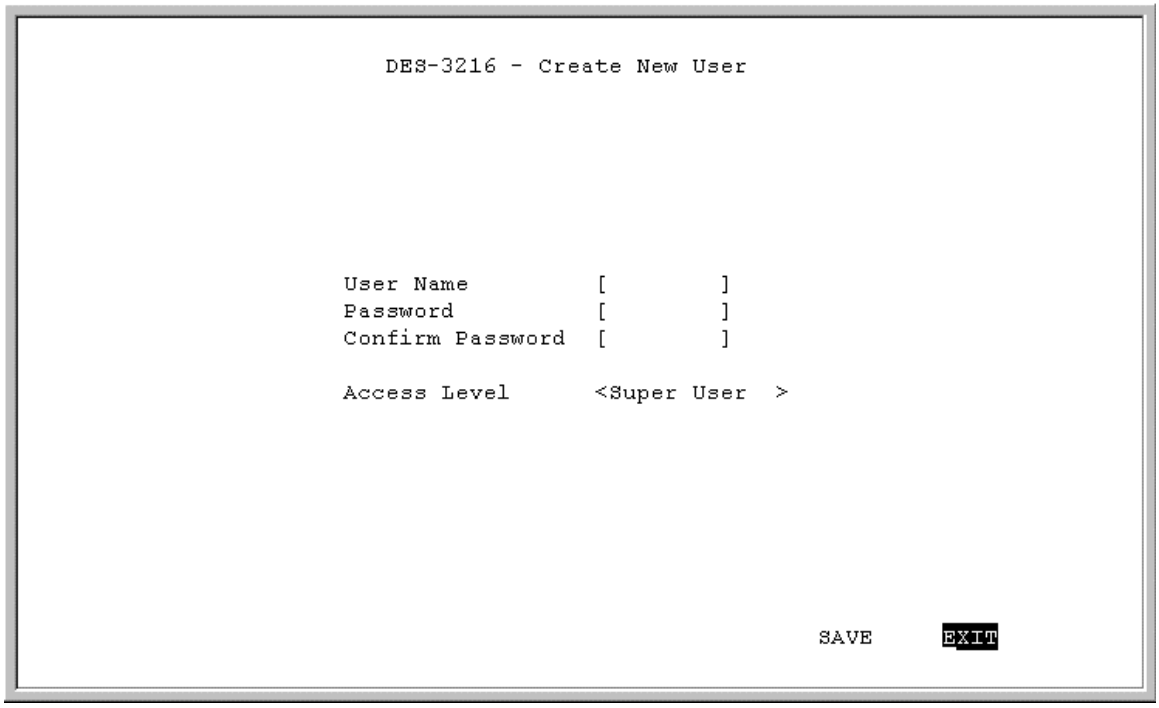

Figure 20: Create New User

User Name

Enter the user's name in this field. User names are case sensitive. You can enter a maximum of eight characters.

Password

Enter the user's password in this field. Passwords are case sensitive. You can enter a maximum of eight characters.

Confirm Password

Reenter the user's password to confirm it in this field.

Access Level

There are two access levels available on the DES-3216: Super User and General User.

Super Users have administrative rights on the DES-3216. They can add and delete users, change the configuration of the DES-3216 and perform all management functions.

General Users have read only access to the DES-3216. They can look at the panels but they cannot make any changes to existing settings or configurations.

Follow these steps to add users:

1. Enter the User Name.
2. Enter the Password.

3. Reenter the password in the Confirm Password field.
4. Toggle the space bar to set the access level of the new user.
5. Select Save and press Enter.

Delete Users

The Delete Users panel, displayed in Figure 21, allows you to delete users from the DES-3216. As a safety precaution, the DES-3216 will not allow the user who is currently logged in to delete themselves by accident.

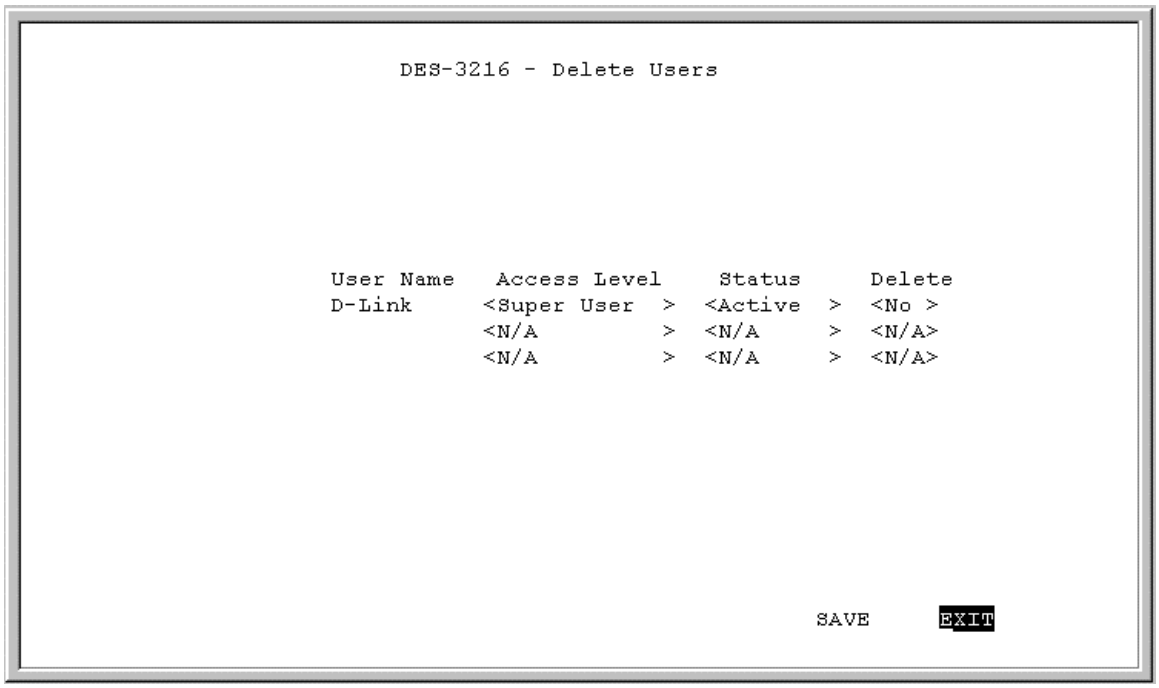

Figure 21: Delete Users

User Name

Identifies the users listed on the DES-3216.

Access Level

Determines whether the user is a Super User with full administrative rights on the network or a General User with read only access rights.

Status

A user's status can be active or inactive. Only active users can log in and make changes. Inactive users cannot.

Delete

Enables you to delete users.

The following operations can be performed independently of each other or combined.

Follow these steps to change user Access Level:

1. Select the user's Access Level.
2. Toggle the space bar to change the current Access Level.
3. Select Save and press Enter.

Follow these steps to change user Status Level:

1. Select the user's Status Level.
2. Toggle the space bar to select the new Status Level.
3. Select Save and press Enter.

Follow these steps to delete users:

1. Select the Access Level of the user you want to delete.
2. Move the cursor to the Delete column and use the space bar to toggle the option from No to Yes.
3. Press Enter.
4. Select Save and press Enter.

Change Password

The Change Password panel, displayed in Figure 22, enables you to change user passwords.

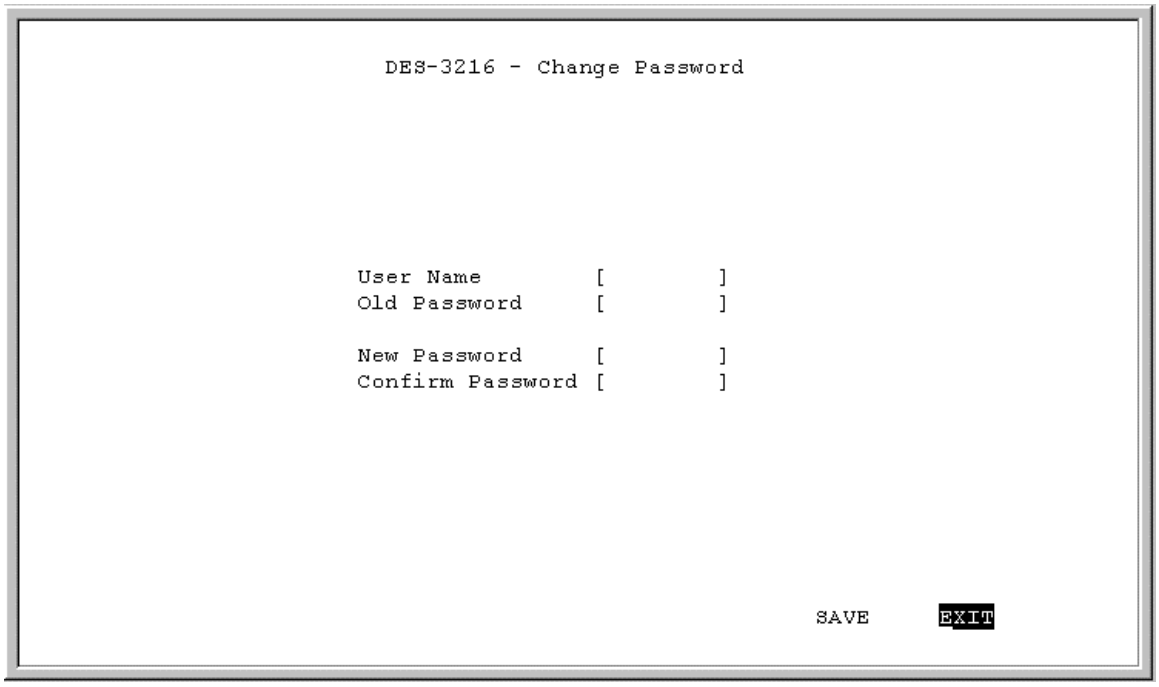

Figure 22: Change Password

User Name

The name of the user whose password you are going to change.

Old Password

The user's old password.

New Password

The user's new password.

Confirm Password

Reenter the new password in this field to confirm it.

Follow these steps to change user passwords:

1. Enter the user's name in the User Name field.
2. Enter the user's old password in the Old Password field.
3. Enter the new password in the New Password field.
4. Reenter the new password in the Confirm Password field.
5. Select Save and press Enter to save your changes.

Switch Port Configuration

The Switch Port Configuration panels are used to configure individual ports on the DES-3216. The only difference between the panels is the port number that they deal with. The options and settings are the same for each. Select the group of ports that you want to configure and then go to the appropriate panel.

Follow these steps to select a panel:

1. Decide which group of ports you would like to work with.
2. Select the group on the Console Program panel.
3. Press Enter to go to the appropriate panel.

Switch Port Configuration Menu

The Switch Port Configuration menu, displayed in Figure 23, enables you to change the configurations of individual ports.

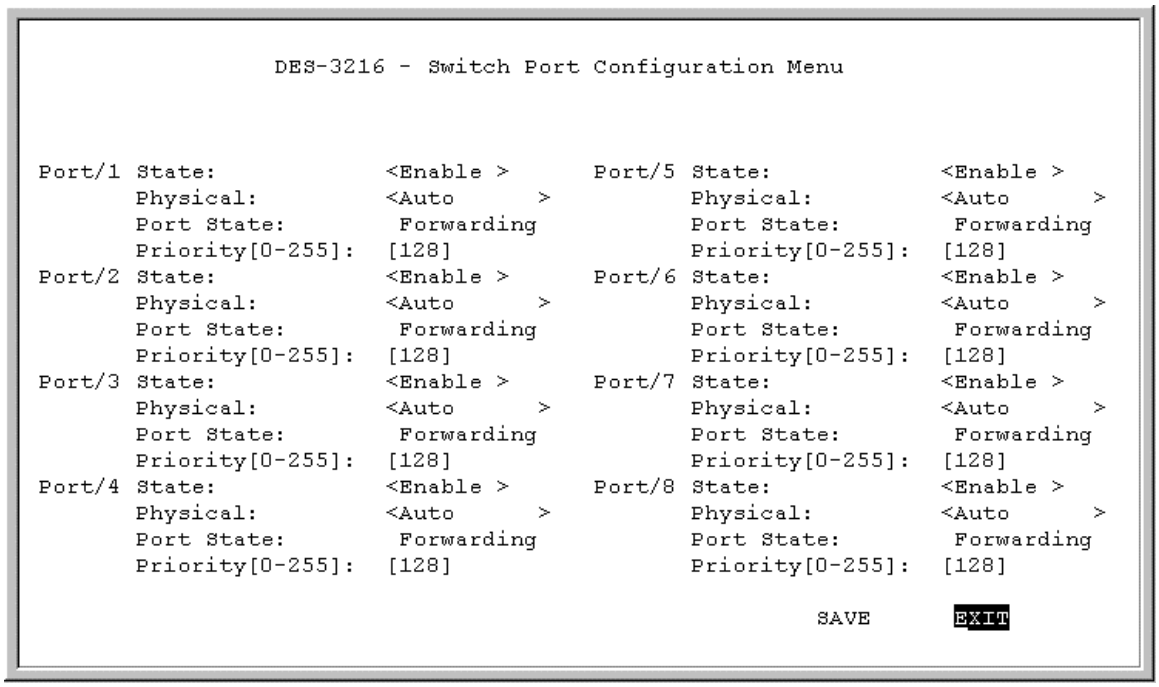

Figure 23: Switch Port Configuration menu

State

All ports have two states: enabled or disabled. Enabled ports transmit and receive data packets. Disabled ports can not transmit or receive packets. You can disable a port but you will not be able to use a disabled port.

Physical

Refers to the physical state of the port. If you manually change the state of a port it will remain in that state until you change it. It will not auto negotiate speed and duplex mode. All ports can be in the following physical states:

- Auto
- 100Tx/Half
- 100Tx/Full
- 10Tx/Half
- 10Tx/Full

Ports in the Auto state automatically negotiate speed and duplex mode. This is the default setting.

Ports set in the 100Tx/Half physical state are set to work at 100 Mbps half duplex.

Ports set in the 100Tx/Full state are set to work at 100 Mbps full duplex.

Ports set in the 10Tx/Half state are set to work at 10 Mbps half duplex.

Ports set in the 10Tx/Full state are set to work at 10 Mbps full duplex.

Port State

All ports have four states: blocking, listening, learning and forwarding. Blocking means that nothing is coming through the port. If the Spanning Tree Algorithm detects a loop it will change the state of the port where the loop is detected to the Blocking State. You can disable the Spanning Tree Algorithm. Forwarding means the port is forwarding data packets to their destination. Listening means that the port is listening for data packets. Learning means the port is learning the MAC address for data packets. This setting cannot be manually changed.

Priority

The port priority can be set from zero to 255. Zero is the highest port priority. The port assigned a zero will be the root port. The default setting will work in most situations.

Follow these steps to change the port state:

1. Select the State setting of the appropriate port.
2. Toggle the space bar to change the current setting.
3. Select Save and press Enter.

Follow these steps to change a port's physical state:

1. Select the physical setting of the appropriate port.
2. Toggle the space bar until you find the appropriate setting.
3. Select Save and press Enter.

Follow these steps to change the port Priority:

1. Select the Priority of the appropriate port.
2. Enter a new value between zero and 255.
3. Select Save and press Enter.

Spanning Tree Configuration

The Spanning Tree Configuration panel is used to configure the Spanning Tree Algorithm. The Spanning Tree Algorithm (STA) in the DES-3216 allows you to create alternative paths (using multiple switches or bridges) in your network. These backup paths are idle until the DES-3216 determines that a problem has developed in the primary path. If the primary path breaks down STA will activate the backup path. STA is very complicated and you should understand it well before changing the default settings.

STA Operation Levels

STA operates on the bridge level and the port level. On the bridge level, STA calculates the Bridge Identifier for each DES-3216 then sets the Root Bridge and the Designated Bridges. On the port level, STA sets the Root Port and Designated Ports.

Spanning Tree Configuration Menu

The Spanning Tree Configuration menu, displayed in Figure 24, allows you to enable or disable STA, set bridge priority and other configurations.

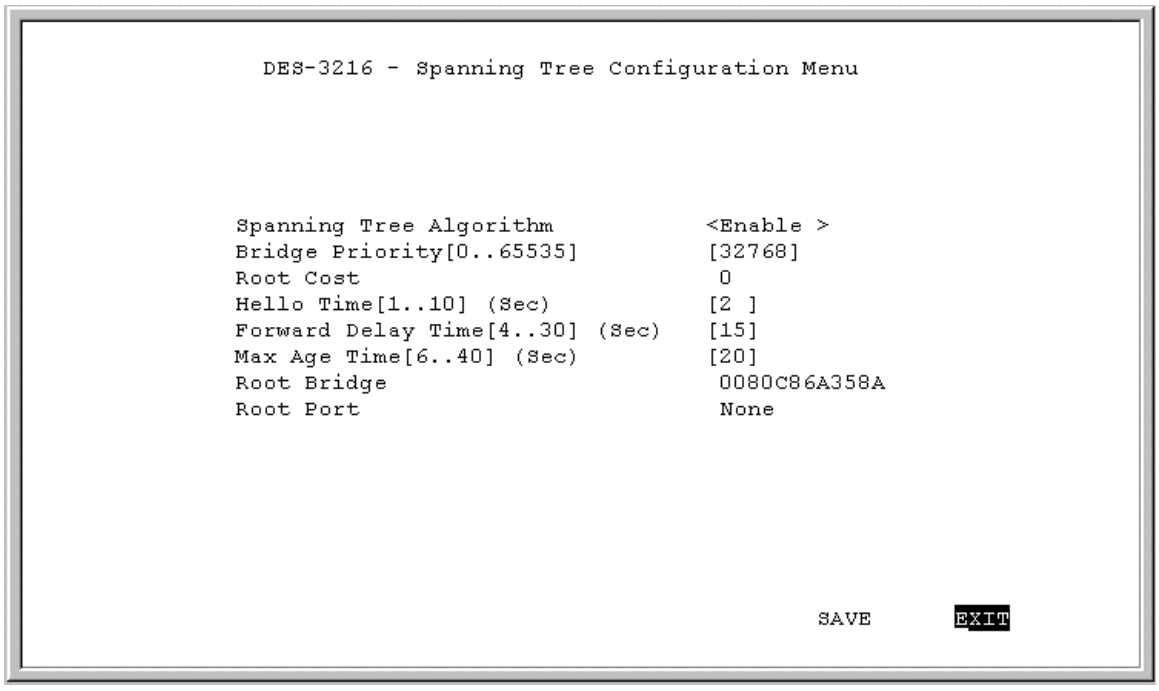

Figure 24: Spanning Tree Configuration menu

Spanning Tree Algorithm

Spanning Tree Algorithm can be enabled or disabled. Use Spanning Tree to prevent network loops.

Bridge Priority

The Bridge Priority can be from 0 to 65535. Zero is the highest Bridge Priority. The higher the Bridge Priority the greater the chance that the DES-3216 will be selected as the Root Bridge. The DES-3216 with the highest Bridge Priority is the Root Bridge.

Root Cost

The Root Cost is the number of times a packet is regenerated before reaching its destination. A source sends a packet to the first device (switch or hub) on the network. When the packet reaches the next hub or switch and is sent out again, the Path Cost becomes two. Each switch and active hub regenerates the packet. To determine the Root Path Cost, count the number of times the packet is regenerated.

The switch with the lowest Path Cost is the Root Bridge. Make the Root Bridge the best switch on the network.

Hello Time

Is the interval between two transmissions of packets sent by the Root Bridge to tell all other switches that it is the Root Bridge. The Hello Time can be set manually, with a range in seconds from 1 to 10. If the Hello Time is set for the switch and the switch is not the Root Bridge then the Hello Time will not take effect until the switch becomes the Root Bridge.

Forward Delay Time

This is the time any port on the DES-3216 spends in the listening state while moving from the listening state to the forwarding state. It can be set from 4 to 30 seconds.

Use the following formula when setting the Hello Time and the Forward Delay Time:

2 x (Forward Delay minus 1 second) $\geq$ Max Age

2 x (Hello Time plus 1 second) $\leq$ Max Age

Max Age Time

Is the time a non-root bridge waits for a packet to be sent. At the end of the Max Age, if a packet has not been received from the Root Bridge, the DES-3216 will start sending its own packets and request permission to become the Root Bridge. If it turns out that the DES-3216 has the lowest Bridge Identifier it will become the Root Bridge.

The switch with the lowest Bridge Identifier is the Root Bridge. It is best to make the Root Bridge the best switch on the network to ensure the best network performance and reliability.

Root Bridge

Specifies the MAC address of the Root Bridge. The DES-3216 may or may not be the root bridge. The DES-3216 is the default root bridge.

Root Port

Specifies the preferred path to the Root Bridge. Only one path per bridge can exist. The default setting is none.

Table 4: User Selective STA parameters

STA parameters	Settings	Effects	Comment
Enable/Disable	Enable/ Disable	Participate in or remove from STA	Enable in a SNMP network.
Bridge Priority	Lower the #, higher the priority	Increases chance of becoming the Root Bridge	Avoid, if the switch is used in workgroup level of a large network
Hello Time	1 – 10 seconds	No effect, if not Root Bridge	Never set greater than Max Age Time
Max Age Time	6 – 40 seconds	Compete for Root Bridge, if BPDU is not received	Avoid low number for unnecessary reset of Root Bridge
Forward Delay	4 – 30 seconds	High # delays the change in state	Max Age $\leq$ 2 x (Forward Delay - 1) Max Age $\geq$ 2 x Hello Time + 1)
Port Level STA parameters			
Enable/ Disable	Enable/ disable	Enable or disable LAN segment	Disable a port for security or problem isolation
Port Priority	Lower the #, higher the priority	Increases chance of becoming the Root Port	

SNMP Management Configuration

The SNMP Management Configuration panel is used to configure the DES-3216 for SNMP management. Leave the default values in place if you are not managing your network through SNMP.

The DES-3216 uses the standard MIB-II Management Information Base module. The MIB values can be retrieved from any SNMP based network manager. The DES-3216 supports its own proprietary enterprise as an extended MIB. The MIB can be retrieved by specifying their Object-Identity (OID). MIB values can be either read-only or read-write.

Read-only MIB variables can be constants that are programmed into the DES-3216 or variables that change while the DES-3216 is running. For example, the number and type of ports on the DES-3216 is a read-only constant. The number and type of ports is fixed. Statistics, such as the number of errors that have occurred, are read-only variables.

Read-write MIBs are usually related to user customized configurations. Examples of these are the DES-3216's IP address, STA parameters and port status.

If you use third party vendors' SNMP software to manage the DES-3216, a diskette listing the DES-3216's proprietary enterprise MIB can be obtained by request. If your software provided functions to browse or modify MIB, you can get the MIB values and change them (if the MIB's attributes permit the write option). This process can be difficult. You must know the MIB OIDs and retrieve them one by one.

SNMP Management Configuration Menu

The SNMP Management Configuration menu, displayed in Figure 25, enables you to configure the DES-3216 for SNMP management.

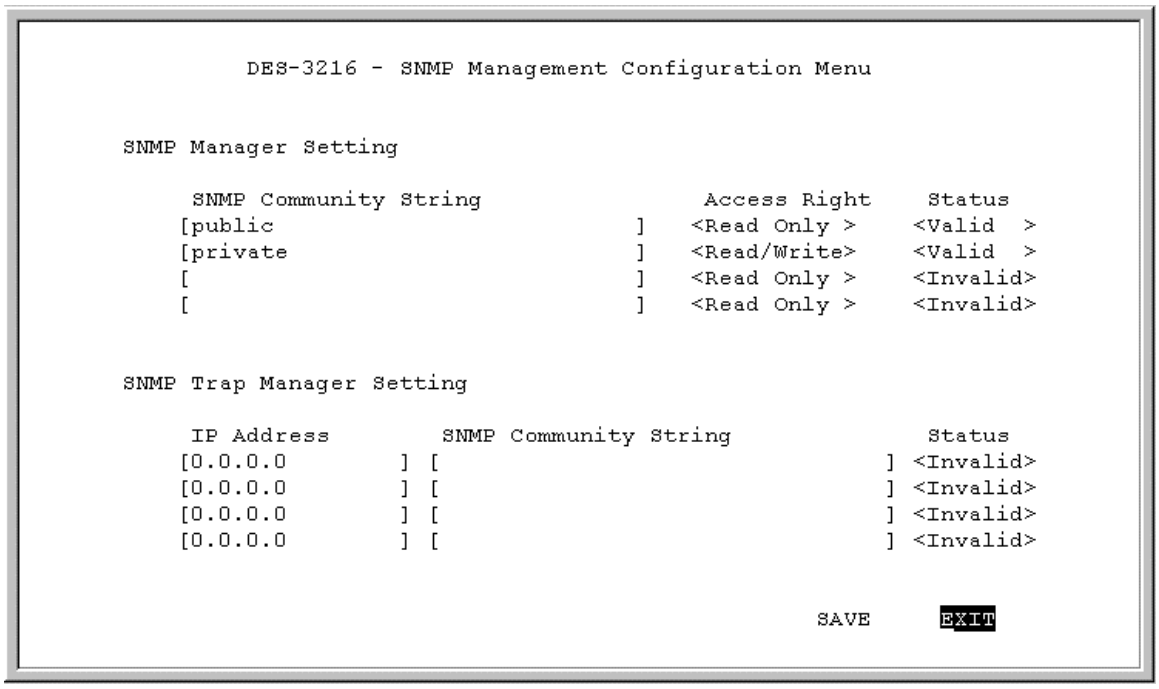

Figure 25: SNMP Management Configuration menu

SNMP Manager Setting

The fields under this setting are used to configure the DES-3216 for SNMP Management. You must configure these fields in order to manage the DES-3216 through SNMP.

SNMP Community String

The SNMP Community String field allows you to name the SNMP Communities. The names public and private are only default names. For security you should change these names to help prevent unauthorized access to the DES-3216.

You can name the SNMP communities anything you like. You can enter up to 32 characters in each of the four fields. You can create up to four SNMP Communities.

Access Right

Enables you to set the rights that members of the SNMP Communities have. Read Only access rights mean that members of the community can view the information on the DES-3216 but they can not make changes to the configurations. Read/ Write access rights allow the members of the community to make any changes they desire.

Status

Can be Valid or Invalid. Only communities with Valid status can access the DES-3216. Communities with Invalid status cannot access the DES-3216.

SNMP Trap Manager Setting

Enables you to enter the IP addresses of Trap Managers. Traps are messages the DES-3216 sends out to inform trap managers of events on the network. The DES-3216 generates traps and sends them to the network manager. Trap managers are special network users who are given certain rights and access to oversee and maintain the network. This feature is available only in D-View or by using other SNMP management software.

You can specify which network managers may receive traps from the DES-3216 by creating a list of IP Addresses of the authorized network managers.

Trap managers can receive the following trap types:

- Cold Start
- Authentication Failure
- Link Change Event

Cold Start

Signifies that the DES-3216 has been powered up. Software settings are reconfigured and hardware systems are rebooted. A cold start is different from a factory reset.

Authentication Failure

Signifies that an addressee (or manager/ user) on the DES-3216 is not a valid user of the DES-3216 and may have entered an incorrect community name.

Link Change Event

Signifies that the link of a port has changed from link up to link down or vice versa.

IP Address

This field is used to enter the IP Addresses of Trap Managers.

SNMP Community String

Enter the Community String of the Trap Mangers in this field.

Status

The DES-3216 will not send out traps unless the status is Valid.

Follow these steps to enter the SNMP Community String:

1. Enter the name of the SNMP Community.
2. Select the Access Right field and toggle the space bar to select Read Only or Read/ Write.
3. Select the Status field and toggle the space bar to select Valid or Invalid.
4. Select Save and press Enter.

Follow these steps to configure the SNMP Trap Manager Setting:

1. Enter the IP Address of the Trap Manager.
2. Enter the name of the SNMP Community String.
3. Select Status and toggle the space bar to select Valid or Invalid.
4. Select Save and press Enter.

VLAN Port Management

A Virtual Local Area Network (VLAN) is a logical subgroup within a LAN that is created with software rather than physical connections. The purpose of a VLAN is to prevent broadcast storms and ease congestion on your network.

Each VLAN created is a broadcast domain. A broadcast is a packet that is sent to all nodes on the network. A broadcast domain is a domain in which every node in the domain receives the broadcast packet. The advantage of creating VLANs is that they permit you to group LAN segments together in order to get the most out of your network.

VLANs become more important as the network grows and traffic increases. VLANs are usually used on high traffic networks. You should consider a VLAN on a smaller network if a department or workgroup routinely does tasks that take up a lot of bandwidth and they are not already on their own LAN segment.

VLANs can be used to subdivide the network. The DES-3216 supports port based VLAN. Port based VLAN means that the VLAN is grouped by port. If a VLAN is created using three ports, then those ports become a separate broadcast domain.

By using VLANs, members of a particular department or workgroup can be partitioned from the rest of the network. For example, the marketing department can be on one VLAN and the accounting department can be on another. If a workstation in marketing sends a broadcast packet to another workstation in marketing the packet will remain in the marketing VLAN.

VLAN Port Management Menu

The VLAN Port Management menu, displayed in Figure 26, enables you to create, delete and modify VLANs on the DES-3216.

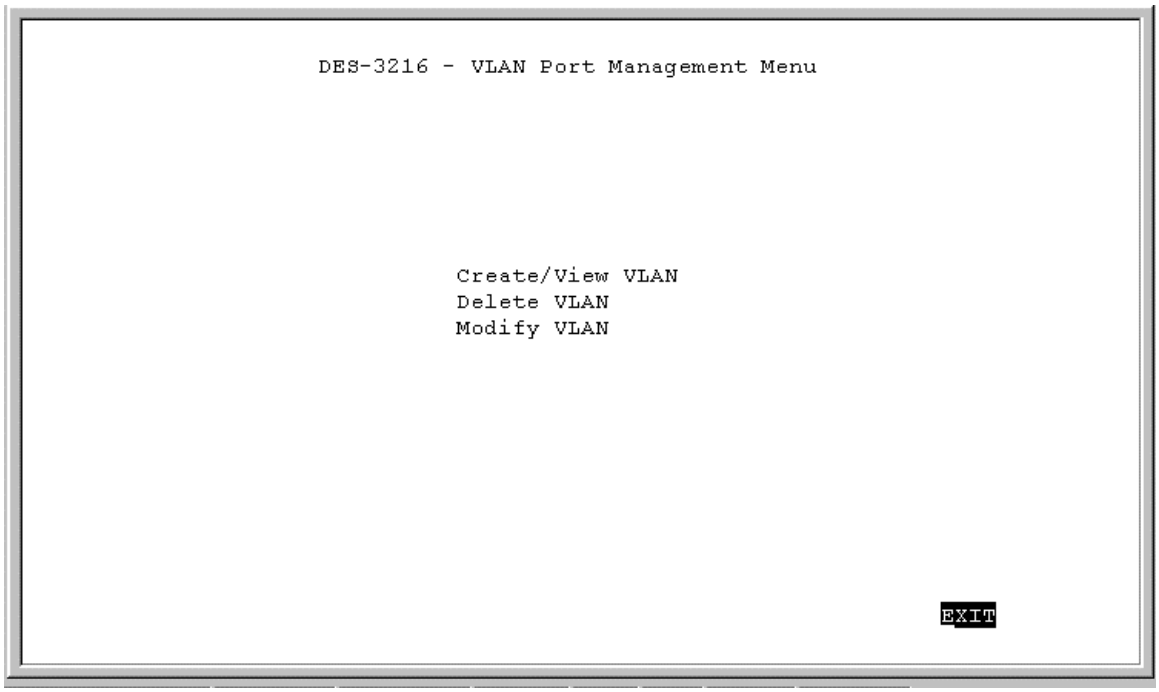

Figure 26: VLAN Port Management menu

Follow these steps to create, delete and modify VLAN:

1. Select the appropriate option.
2. Press Enter.

Create New VLAN

The Create New VLAN menu, displayed in Figure 27, is used to create a new VLAN. The default value is that all ports belong to one VLAN. You can create up to eight separate VLANs. Ports can belong to two VLANs at the same time. Each VLAN is a broadcast domain. If you have created a trunking group, you must include the entire trunk group in the VLAN.

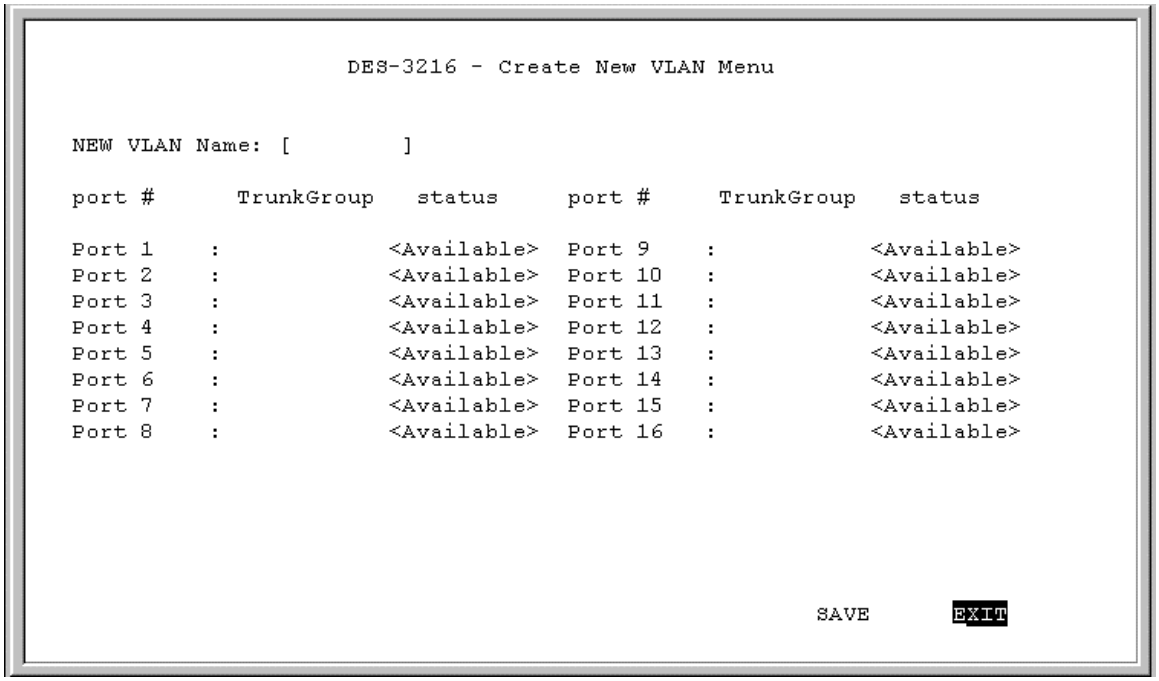

Figure 27: Create New VLAN menu

New VLAN Name

Is the name of the VLAN you are creating. All VLANs must have a unique name.

Port

Is the number of the port. The numbers on the panel match the ports on the DES-3216. Some ports are combined. For example, ports 1 and 3 are shown as "Port 1/3". Ports that are grouped together must be part of the same VLAN.

TrunkGroup

This field identifies the trunk group that the port has been assigned to. The field is open if the port has not been assigned to a Trunk Group.

Status

The status field can be either available or selected. Available indicates that the port is available for inclusion in a VLAN. Selected indicates the port has been assigned to a VLAN.

All ports will have a status of available on this panel, even after they have been selected as part of a VLAN. There is nothing on this panel that indicates the port is already part of a VLAN.

Follow these steps to create a VLAN:

1. Enter the name of the VLAN you are creating.
2. Select the ports you want to include in the VLAN and toggle the space bar to change the status from Available to Selected.
3. Select Save and press Enter.

Delete VLAN Menu

The Delete VLAN menu, displayed in Figure 28, is used to delete VLANs.

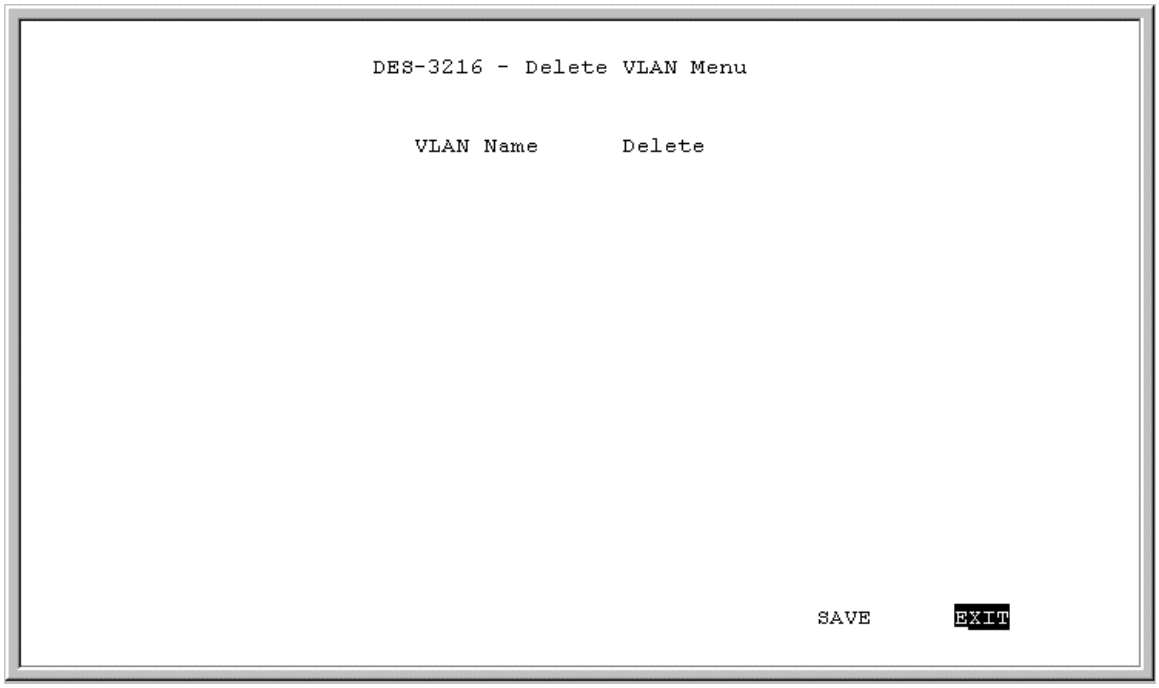

Figure 28: Delete VLAN menu

VLAN Name

Is the name of the VLAN.

Delete

After you have created a VLAN, this column will have the option to delete it.

Follow these steps to delete VLANs:

1. Select the VLAN you want to delete in the Delete column.
2. Toggle the space bar to Yes to delete the VLAN.
3. Select Save and press Enter.

4. A screen prompt will warn you that you must reset the DES-3216 in order for the change to take effect.

Modify VLAN Menu

The Modify VLAN menu, displayed in Figure 29, enables you to modify VLANs.

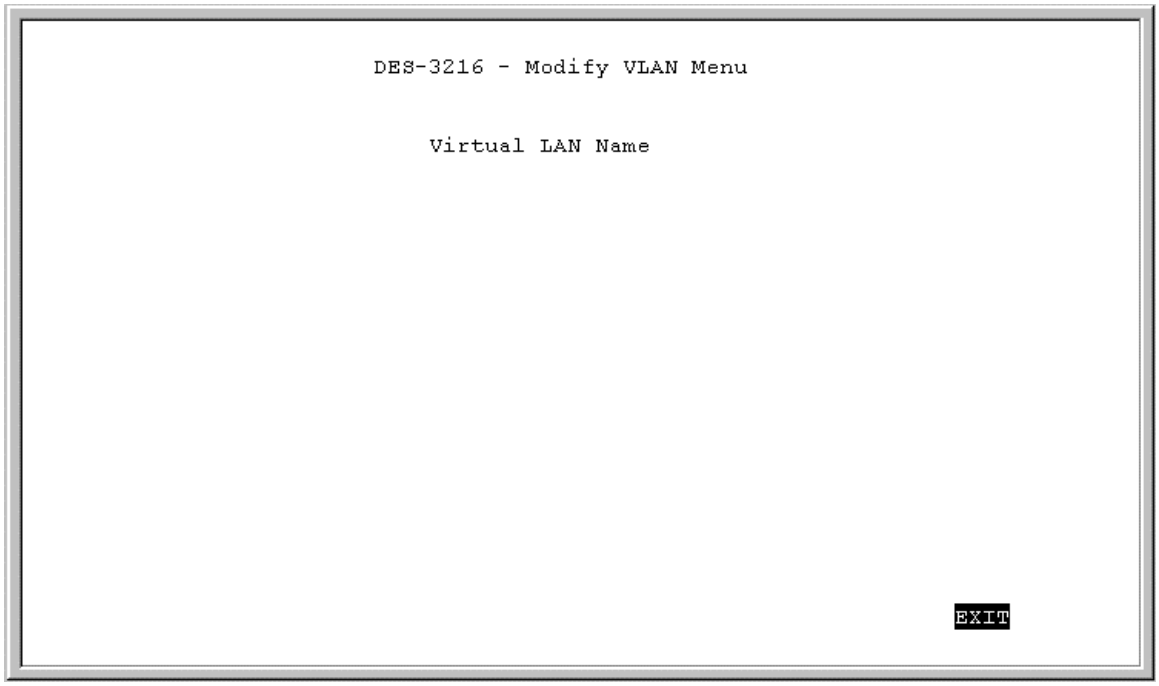

Figure 29: Virtual LAN Name

Virtual LAN Name

The names of all VLANs appear in this column.

Follow these steps to modify VLANs:

1. Select the name of the appropriate VLAN.
2. Press Enter.
3. You will see the VLAN Modify menu. Use this panel to modify a VLAN.
4. Select the ports that you want to include in the VLAN or delete from the VLAN. Toggle the space bar to change the current setting. Available means the port is available for inclusion in the VLAN. Selected means the port has been selected as part of a VLAN.
5. Select Save and press Enter to implement your changes.

Trunking Port Management Menu

The Trunking Port Management panels are used to create, delete and modify trunk ports.

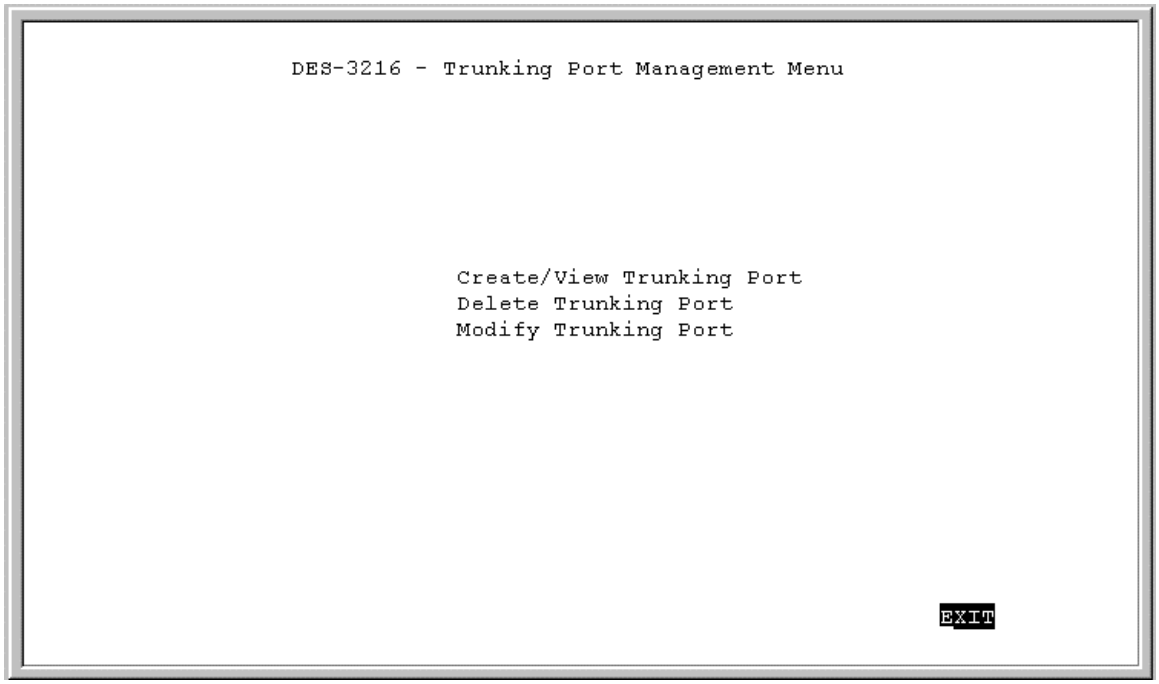

Figure 30: Trunking Port Management menu

Follow these steps to create, delete and modify trunk ports:

1. Select the appropriate option.
2. Press Enter.

Create New Trunking Port

The Create New Trunking Port panel, displayed in Figure 31, is used to create Trunk Ports. You can create up to seven trunking groups with up to eight ports in each group. Each Trunking Group acts like a single port.

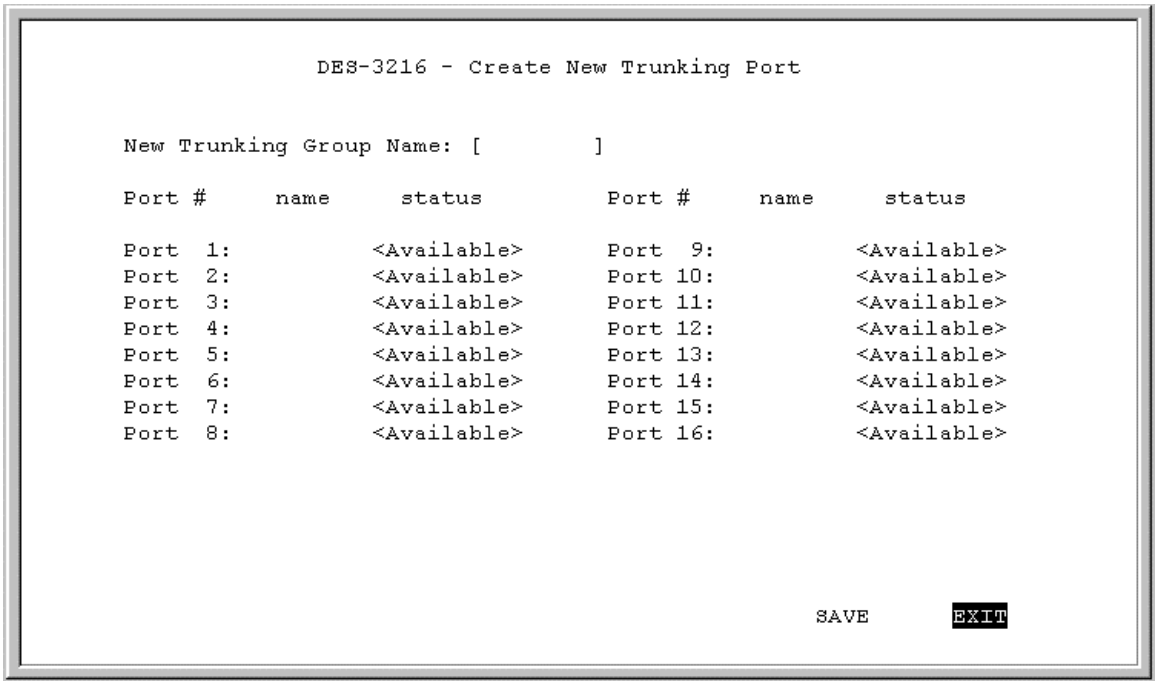

Figure 31: Create New Trunking Port

New Trunking Group Name

Is the name of the Tunking Group you are going to create. All Trunking Groups must have a name.

Port

Is the number of the port. The numbers on the panel match the ports on the DES-3216. Some ports are not available for trunking. For example, port 3 has a status of N/A. Ports that are shown as N/A are not available for inclusion in any trunking groups.

Name

This field identifies the TrunkGroup that the port has been assigned to. The field is open if the port has not been assigned to a TrunkGroup.

Status

The status field can be either available or selected. Available indicates that the port is available for inclusion in a TrunkGroup. Selected indicates the port has been assigned to a TrunkGroup. All ports will have a status of available on this panel, even after they have been

selected as part of a TrunkGroup. There is nothing on this panel that indicates the port is already part of a TrunkGroup.

Follow these steps to create a TrunkGroup:

1. Enter the name of the TrunkGroup.
2. Select the ports you want to include in the TrunkGroup and toggle the space bar to change the status from Available to Selected.
3. Select Save and press Enter.

Delete Trunking Port

The Delete Trunking Port panel, displayed in Figure 32, is used to delete Trunk Ports.

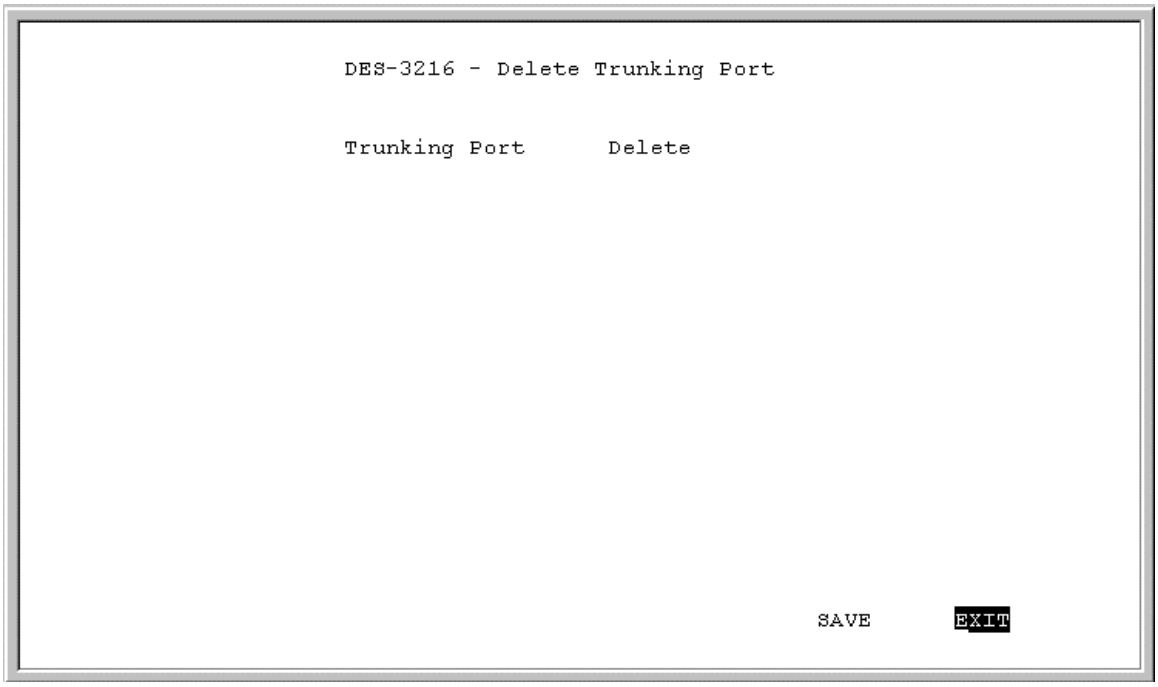

Figure 32: Delete Trunking Port

Trunking Port

Is the name of the Trunking Group.

Delete

After you have created a Trunking Group, this column will have the option to delete it.

Follow these steps to delete a Trunking Group:

1. Select the Trunking Group you want to delete in the Delete column.
2. Toggle the space bar to Yes to delete the Trunking Group.
3. Select Save and press Enter.

Modify Trunking Port

The Modify Trunking Port panel, displayed in Figure 33, enables you to Modify Trunking Ports.

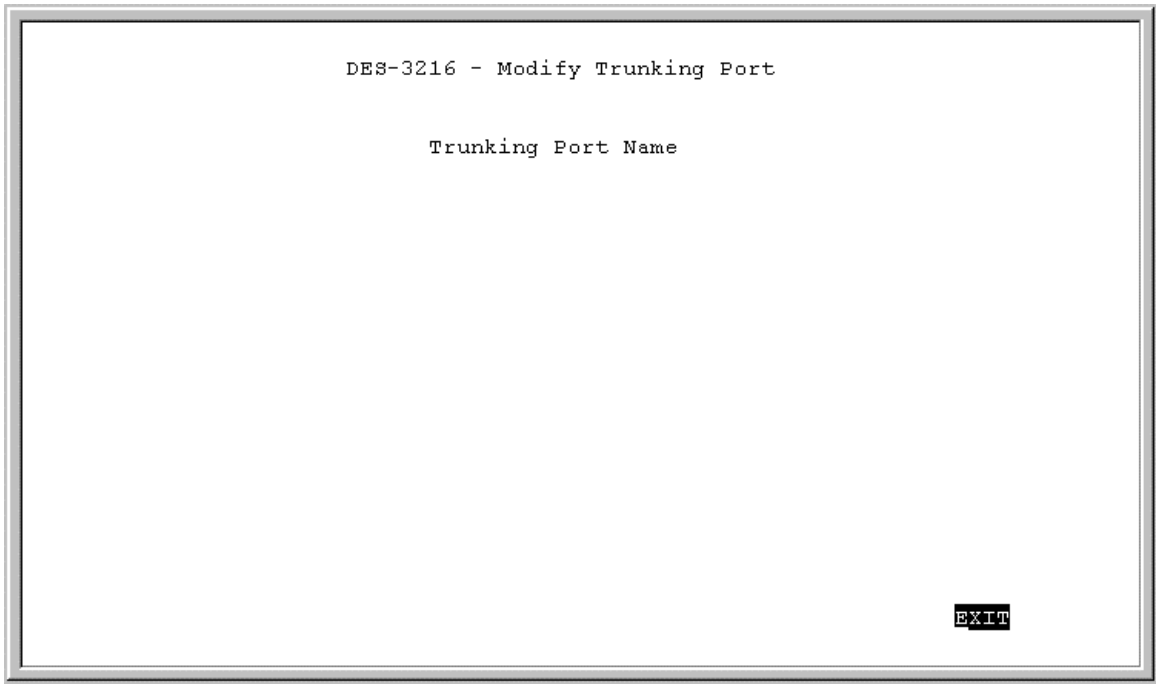

Figure 33: Modify Trunking Port

Trunking Port Name

The names of all Trunked Ports appear in this column.

Follow these steps to modify Trunked Ports:

1. Select the name of the appropriate Trunked Port.
2. Press Enter.
3. You will see the Modify Trunking Port panel shown in Figure 33. Use this panel to modify a Trunking Group.
4. Select the ports that you want to include in the Trunking Group or delete from the Trunking Group. Toggle the space bar to change the current setting. Available means the port is available for inclusion in the Trunking Group. Selected means the port has been selected as part of a Trunking Group. N/A indicates ports that are not available for inclusion in any trunking group.
5. Select Save and press Enter to implement your changes.

6

Troubleshooting

This troubleshooting section is intended to help you solve the most common problems on the DES-3216.

The DES-3216 does not have external LED error messages. If there is an error and it cannot be resolved by implementing the solutions in this section, contact D-Link Technical Support.

All LEDs are explained in detail in Chapter 4, *LEDs.* If you are having a problem that is not discussed here, contact technical support.

Problem Solution

POST Errors

The DES-3216 performs a Power On Self Test (POST) every time it is powered on. If you are connected to the DES-3216 through Local Console Management during the POST you can see the results displayed on your monitor. The login screen appears after the DES-3216 has completed the POST.

The POST checks all of the hardware components on the DES-3216.

Cables

Faulty cables are the most common source of problems on Ethernet and Fast Ethernet networks. Check the cables first if you are having any problems connecting to a device.

Ethernet is more fault tolerant than Fast Ethernet. If you are moving from Ethernet to Fast Ethernet, make sure the cables are pinned out correctly. See Chapter 3, *Connecting the DES-3216 to the Network,* Cable Specifications, for a diagram showing the proper pin arrangement for Ethernet and Fast Ethernet.

Port States

All ports on the DES-3216 have two modes: auto negotiation mode and forced mode. Ports in auto negotiation mode auto negotiate the proper speed and duplex mode. Ports in forced mode have been manually set to a particular speed and duplex mode. Check the LEDs on the DES-3216 and on the Network Interface Card to verify settings. See Chapter 4, *LEDs,* for an explanation of all LEDs.

The port settings on the DES-3216 and the port settings on the device you are connecting to must be the same in order for them to communicate. Check the speed and duplex setting on both the port and device you are connecting to.

Power LED is Off

Check the power plug and verify that you are getting power from the wall socket. If the DES-3216 is on, the power LED is not working properly. Return the DES-3216. If the DES-3216 is not powering on

and power is being received though the wall socket, the power supply is not working. Return the unit.

All LEDs are Off

Check the power plug and verify that the DES-3216 is receiving adequate power. Log in to the DES-3216 using Local Console Management, see Chapter 5, *Managing the DES-3216*, for instructions.

Power the DES-3216 off and then power it on again. Use the monitor to check the error messages. Return the DES-3216 to D-Link for service if the problem persists.

Forget Password

If you forget your password, contact D-Link Technical Support at (949) 788-0805 for assistance or check our web site at www.dlink.com.

Appendix A

DES-3216 Technical Specifications

Switch Specifications

- Complies with IEEE 802.3 CSMA/CD 10 Base-T, 100 Base-TX
- Complies with IEEE 802.1d Spanning Tree
- Switched IEEE 802.3 MAC layer frame size: 64-1518
- NWAY Auto-negotiation for each 10 Base-T/ 100 Base-TX network port providing auto-detection of connected cable type, auto-sensing of full and half duplex signaling and auto-configuration
- Cut-Through and Store-and-Forward switching for reliable error-free packet transfers
- Native SNMP management support with Ethernet MIB II (RFC 1213), RMON MIB (RFC 1757) and bridge MIB (RFC 1493)
- 8,192 maximum entries for MAC address Table
- Comprehensive LED indicators display of the system/ port status
- 512KB EEPROM (flash memory) for firmware upgrade
- RS-232 (DB-9) port for Out-of-Band management (asynchronous, 8-bit data, 1 stop bit, no parity, 19.2 K baud)
- Rack mountable (Fits standard 1.5 U EIA 19" rack)
- Includes 16 10/100 Mbps Ethernet ports with built-in support of RMON and VLAN
- Supports Trunking Group

Port Specifications

- 16 RJ-45 ports for Cat 3, 4, or 5 UTP cable (Cat. 5 req. for 100 Base-TX)
- 10 or 100 Mbps data transfer rate
- NWAY Auto-negotiation
- Full or Half Duplex

General	
Standards:	IEEE 802.3 10 Base-T Ethernet IEEE 802.3u 100 Base-TX Fast Ethernet ANSI/IEEE Std 802.3 NWAY™ Auto Negotiation IEEE 802.3 Frames types: Transparent IEEE 802.3 MAC layer frame size: 64-1518
Protocol:	CSMA/CD, Full Duplex
Data Transfer Rate:	Fast Ethernet: 100 Mbps (half duplex) 200 Mbps (full duplex)
Topology:	Star
Network Cables:	10 Base-T: 2-pair UTP Cat. 3 (100 m) 4-pair UTP Cat. 4, 5 (100 m) EIA/ TIA-568 150-ohm STP (100 m) 100 Base-TX: 4-pair UTP Cat. 5 (100 m) EIA/ TIA-568 150-ohm STP (100 m)
Number of Ports:	16 x 10/100 Mbps NWAY Ethernet ports

Physical and Environmental	
AC inputs:	100 – 240 VAC, 50/60 Hz (internal universal power supply)
Power Consumption:	70 watts maximum
DC fans:	2 built in 60 x 60 mm fans
Operating Temperature:	0 ~ 50 degrees Celsius
Storage Temperature:	-25 ~ 70 degrees Celsius
Humidity:	5% ~ 95% non-condensing
Dimensions:	441 x 264 x 81 mm (1.5 U), 19 inch rack-mount width
Weight:	4.3 Kg
EMI:	FCC Class A, CE Mark Class A, VCCI Class A
Safety:	UL (UL 1950), CSA (CSA950), TUV/GS EN60950)

Performance	
Transmission Method:	Cut-Through and Store-and-Forward
RAM Buffer:	1 M bytes per device
Filtering Address Table:	8 K entries per device
Packet Filtering/ Forwarding Rate:	148810 pps per port (for 100 Mbps)
MAC Address Learning:	Automatic update Max age: five minutes

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